Aalto University
School of Business

Disruptive Coopetition

How Start-Ups Disrupt Industries in Coopetitive Partnerships with Incumbent Firms

Master's Thesis
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Management and International Business
Spring 2019

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Abstract of master's thesis

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Title of thesis Disruptive Coopetition: how start-ups disrupt industries in coopetitive partnerships with incumbent firms

Degree Master of Science in Economics and Business Administration

Degree programme Management and International Business

Thesis advisor(s) Liisa Välikangas

Year of approval 2019 **Number of pages** 117 **Language** English

Abstract

Disruptive start-ups empowered by digitization are increasingly rendering business models of incumbent firms obsolete. At the same time, these start-ups face significant challenges as a result of the fast-paced and uncertain commercial environment. Instead of competing with each other, disruptive start-ups can engage in coopetitive partnerships with incumbent companies to collaboratively diffuse innovation. Coopetition constitutes a phenomenon characterized by simultaneous cooperation and competition. While the majority of previous research has focused on coopetition among equally large firms, this thesis combines the fields of disruptive innovation theory and coopetition by concentrating on partnerships between disruptive start-ups and incumbents.

This qualitative, multiple-case study is based on four start-ups in the energy industry, which develop a disruptive, blockchain-based platform and which are engaged in partnerships with incumbent firms threatened to be disrupted. The study draws on both primary and secondary data in form of interviews, whitepapers and other documents published by the case companies. The data analysis is conducted in four steps: within-case analysis, cross-case analysis, identification of patterns and creation of framework. The resulting theoretical framework takes previous research as well as novel empirical findings into account and presents a holistic basis for coopetition between start-ups and incumbents.

Besides the theoretical framework, the main findings of the study are threefold. First, an intertemporal tension in the realization of benefits becomes evident, as the start-ups are able to capture value from the coopetition before the established firms can. Second, a model emerges which shows that external and internal factors significantly influence the balance of cooperative and competitive forces. External factors include changes in the commercial environment, whereas internal factors summarize the perceived marginal benefits of the partnership. Third, the study finds that the strategies of the case companies envisage a two-phase commercialization strategy, with a sustaining innovation in the first phase transitioning to a disruptive innovation in the second phase. Synthesizing these key findings, the study concludes that coopetition between start-ups and incumbents constitutes a distinct phenomenon and demands a finer-grained definition. Hence, the term "heterogeneous coopetition" is introduced to offer a pathway for future research.

From a managerial perspective, this study provides insight into an effective way for start-ups to diffuse disruptive innovations as well as for incumbent companies to react to disruptive threats. For both parties, the results of this research amplify recommendations how value creation and appropriation processes in heterogeneous coopetitive partnerships can be fostered. As the study takes place in the energy industry, the empirical findings and managerial implications of this thesis are generalizable for environments with similar characteristics. Replication of the underlying methodological approach of this study in other environments is required to substantiate or to repudiate the empirical findings and to enlarge their generalizability. Furthermore, since research in the conjunction of disruptive innovation theory and coopetition is still scarce, considering other constellations of dissimilar coopetition partners represents potential to bolster the newly defined term of heterogeneous partnerships.

Keywords coopetition, partnerships, disruptive innovation, disruption, disruptive strategy

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List of Abbreviations

BDL - Business Development Leader

CIO - Chief Information Officer

CMO - Chief Marketing Officer

ICT - Information and Communication Technology

RPV - Resources, Processes, Values

RQ - Research Question

S&P - Standard & Poor's

SL - Strategy Leader

SQ - Sub-question

1 Introduction

Approximately half of all S&P 500 firms are expected to be replaced within the next decade. The average tenure of these enterprises is estimated to shrink from 33 years in 1965 to merely 14 years in 2026. The emergence of disruptive start-ups plays an important role in this increasingly fast-paced displacement of incumbent companies (Anthony *et al.*, 2016). Airbnb, Spotify and Uber are only three examples for entrepreneurial firms, which redefined their industry landscape by capitalizing on innovative business models based on digital technologies. However, start-ups face considerable economic, technological as well as regulatory uncertainty in early stages of the venture, while incumbent firms represent a virtually insurmountable obstacle (Bhide, 2000; Stinchcombe, 1972). Instead of emerging as a direct competitor of these established firms, disruptive start-ups have the option to engage in partnerships with these to jointly create value. This phenomenon, the simultaneous cooperation and competition between potentially disruptive start-ups and disrupted incumbents is termed "coopetition" (Ansari *et al.*, 2016).

1.1 Background and Research Problem

In coopetitive partnerships, start-ups and incumbents combine complementary skills and resources to collaboratively cope with uncertainties and obstacles. In an increasingly complex and fast-paced business environment, partnerships across organizational boundaries become increasingly relevant (De Backer and Rinaudo, 2019). Hence, research in this area adds value to multiple stakeholders.

From an academic perspective, I seek to contribute to the advancement of two still nascent but rapidly developing research fields: disruptive innovation theory and coopetition. In the former, Christensen (1997) has first introduced the distinction between sustaining and disruptive innovation, drawing on previous findings from scholars such as Bower (1970) and Dosi (1982). According to the initial definition by Christensen, disruptive innovation results in a product underperforming the incumbent product in regard to mainstream attributes but outperforming this product in regard to novel attributes such as convenience or simplicity, creating a new value proposition for customers (Christensen, 1997). Even though the findings of this basic research are still valid today, several authors have contributed to the further development of this field. Markides (2006) additionally distinguishes disruptive technological, product and business model innovation to amplify the distinct challenges and implications. A magnitude of research in the framework of

disruptive innovation theory has also been focussed on response strategies of incumbent firms to disruption by new entrants (Markides and Oyon, 2010; Wessel and Christensen, 2012). Marx *et al.* (2014) specifically pronounced partnerships with disruptive start-ups as a viable response strategy. Moreover, research in this area also considered the roles of regulation and digitisation in the context of disruptive innovation. As the key author in this research stream, Christensen *et al.* (2004) depict that governmental regulations have a significant impact on the innovation landscape of an industry, while Skog *et al.* (2018) framed the concept of digital disruption, underscoring the importance of digital technologies in the innovation process.

Not only as a response strategy to disruptive innovation, the concept of coopetition was introduced by Brandenburger and Nalebuff (1996) based on previous research in the field of strategy and innovation (Hamel, 1991; von Hippel, 1987). It describes a paradoxical phenomenon of cooperation among competitors to jointly create value. Research has particularly concentrated on the process of coopetition with its dynamic balance, tensions and critical success factors. Gnyawali and Charleton (2018) and Luo *et al.* (2016) link the coopetitive balance, the balance of cooperative and competitive forces among the partners, to the innovation performance. Furthermore, Petter *et al.* (2017) add the concept of coopetitive maturity to previous literature, explaining that the coopetitive maturity is affected by internal and inter-relationship factors. Analysing the existent research in this field, it becomes evident that the majority of research is focussed on innovation performance of coopetitive partnerships (i.e. Bengtsson and Kock, 2000; Pereira and Leitao, 2016; Yami and Nemeh, 2017). Moreover, authors have analysed the opportunities and risks in the framework of coopetitive partnerships to elucidate how value is created (Bouncken *et al.*, 2015; Levy and Powell, 2003).

Connecting the research areas of disruptive innovation theory and coopetition, initial research has taken place in the field of coopetition among disruptive start-ups and incumbents. Several authors highlight that these partnerships are particularly beneficial due to the high complementarity of skills and resources (Freeman and Engel, 2007; Weiblen and Chesbrough, 2015). However, the research in this conjunction is at an infantile stage. By examining coopetitive partnerships among Austrian start-ups and incumbents, Hora *et al.* (2018) illustrate the dynamics in the initiation phase of these collaborations. Furthermore, Ansari *et al.* (2016) focus on the process of disruption, especially highlighting tensions evolving from the partnership among these unequally

sized partners. These two studies have already identified particularities for the specific case of coopetition between start-ups and incumbent companies. Having identified this aspect, the research problem becomes evident that the findings of previous research in this field, which is primarily based on partnerships among equally-sized competitors, cannot be entirely projected on the specific case.

Besides the academic contribution, I aim to show how innovative start-ups can "disrupt" societal challenges. My view is that the innovative capabilities of start-ups in combination with the economic strength of established companies have the potential to contribute to the solution of these challenges. Moreover, I agree with António Guterres, Secretary General of the United Nations, who recently pronounced climate change as the "most systematic threat of humankind" (Sengupta, 2018). Hence, with this study I seek to utilize Clayton M. Christensen's theory of disruptive innovation to analyse how climate change can be "disrupted". More specifically, this study analyses how innovative solutions of entrepreneurial firms with a profound impact on climate change are diffused in partnerships with incumbent firms within complex industry frameworks such as the energy industry. Furthermore, from a managerial perspective, this thesis intends to support leaders of start-ups and established firms to capture the scientifically proven benefits of coopetition (i.e. Bouncken and Kraus, 2013; Pereira and Leitao, 2016). Specifically for entrepreneurs, this study explicates the possibility of avoiding "battles with giants" by engaging in coopetitive partnerships with them.

1.2 Research Gap and Research Questions

Based on a comprehensive review of existing literature in the field of disruptive innovation theory, coopetition as well as blockchain-technology, I discovered several suggestions of leading authors for future research. Christensen *et al.* (2018) specifically calls for more research on partnerships between disruptive start-ups and disrupted incumbents as a diffusion strategy of and a response strategy to disruptive innovation. This is confirmed by authors in the area of coopetition theory such as Bouncken *et al.* (2015) and Ritala *et al.* (2016). Moreover, Rusko *et al.* (2018) describe the emerging blockchain technology as a specifically interesting area to explore the phenomenon of coopetitive partnerships in this specific constellation.

Considering the potential of coopetitive partnerships among start-ups and incumbents for practice and society in light of the detected research problem, I claim that a research gap

is present in the conjunction of disruptive innovation theory and coopetition. To be more specific, I seek to address the lacuna from the perspective of the disruptive start-up. This is in agreement with the recent study of Christensen *et al.* (2018), which calls for additional research on the specificities in disruption processes. With this study, I aspire not only to further elucidate these specificities, but also to highlight how coopetition can be a proactive strategy of start-ups to disrupt industries in collaboration with incumbents. I plan to close this gap by developing a holistic framework, drawing on previous studies as well as new empirical findings. To guide my research, I define the following research question (RQ) and four supporting sub-questions (SQ):

> *RQ: How are start-ups disrupting a highly regulated industry through coopetitive partnerships with incumbent companies?*
>
> *SQ1: How does the commercial environment impact the strategies of disruptive start-ups?*
>
> *SQ2: Why do disruptive start-ups and incumbent companies pursue coopetitive partnerships?*
>
> *SQ3: How are coopetitive partnerships between disruptive start-ups and incumbent companies performed?*
>
> *SQ4: How do coopetitive partnerships between disruptive start-ups and incumbent companies promote the diffusion process of disruptive innovation?*

While the overarching research-question directly addresses the identified research gap, the four sub-questions provide a structure to systematically analyse multiple aspects of coopetition. The research question with its sub-questions further determine the research design and influence the development of an appropriate methodological approach.

1.3 Research Design

Corresponding with the nature of the research questions, I chose to base the study on a qualitative research design. More specifically, I decided to conduct a multiple case study, as described by Eisenhardt (1989) and Yin (2003). This case study approach is especially applicable for this study since I aim to further explore the phenomenon of coopetition and to add new theory to the research stream.

To establish comparative grounds among the cases, I chose four suitable case companies in a highly systematic approach, by utilizing the concepts of population and theoretical sampling for reducing extraneous variation. The four case companies represent the leading start-ups with blockchain-based peer-to-peer energy trading applications. To ensure the representation of diverse geographical environments, the case companies are based in Australia, Estonia, Singapore, and the United States. These entrepreneurial firms are particularly suitable for the purpose of this study, as their energy trading platforms have the potential to render the business models of incumbent energy retailers obsolete in the long-term. Nonetheless, the start-ups collaborate with the incumbent energy retailers to diffuse their innovation. Per definition, this represents a coopetitive partnership.

As my study focusses the start-up's perspective to coopetitive partnerships, I chose to conduct interviews with key employees in the case companies' strategy and business development departments to collect applicable primary data. To obtain an additional perspective, I decided to interview Michael Barnard as an expert in the field of emerging digital technologies in the energy industry. To ensure validity and reliability, I was further able to triangulate these findings with available secondary data published by the start-ups and incumbent companies in press releases, whitepapers and blogs. To systematically analyse the collected primary and secondary data, I developed a four-step procedure based on those outlined by Eisenhardt (1989) and Yin (2003), utilizing the inductive coding approach as described by Thomas (2006) as well as visualizations as recommended by Miles and Huberman (1994).

Even though I ensure the quality of my research through a carefully developed and highly systematic methodological approach, certain limitations apply to this study. First, this study takes place in the energy industry and, as demonstrated by the findings, the commercial environment has a significant impact on each party and the coopetition. Hence, the findings are restricted to environments with similar characteristics like the energy industry. Second, I focus on the start-up's perspective and thus, the incumbent's perspective has yet to be explored further. Third, some of the empirical findings are based on ex-ante data, meaning explanations of the interviewees about future strategic actions. Consequently, the effectivity and performance results of these decisions cannot be evaluated.

1.4 Thesis Structure

Since the structure aims to ensure the coherence and logic of this study, I decided to divide this thesis into five distinct chapters. After the introduction, I review existing literature in the relevant fields. As required by the research problem, I selected the research areas of disruptive innovation theory, coopetition as well as blockchain-technology for a detailed review. Subsequently, I synthesize the findings of this literature review in a preliminary theoretical framework that guides the development of a suitable methodological approach. Taking the philosophical positioning of this study into account, the methodological approach is elucidated in the third chapter, which also specifies the data collection and analysis procedures. In the last part of this chapter, I evaluate the quality of this methodology and consider ethical concerns.

Having the theoretical framework and the methodology in place, the fourth chapter introduces the empirical findings, divided into three parts. In the first part, the cases are analysed separately to establish an in-depth understanding of each individual case. In the next part, I compare the four cases, identify similarities as well as differences, and eventually discuss emerging patterns. Based on these empirical findings, I modify the theoretical framework in the next step and answer the research questions. In the final part of this thesis, I conclude with the main findings, theoretical contributions, and managerial implications. Additionally, I state the limitations of this study and illustrate promising areas for future research.

2 Literature Review

In this chapter, I review the findings of previous research to develop a theoretical framework for the empirical part of this study, which addresses the identified research gaps. The literature review follows a systematic and logical approach. In the first part, the disruptive innovation theory is introduced to explain the process of disruption and the managerial implications for start-ups and incumbents. Since alliances among competing firms represent one valuable option to respond to disruptive innovations or to disrupt markets actively, the literature about these alliances called "coopetition" is discussed in the second part. At the end of this second part, the previous findings of coopetitive alliances between start-ups and incumbents are explicated, as the empirical study aims to contribute to this more specific field. In the third part of the literature review, blockchain-technology is introduced with a particular focus on its impact on businesses. The review of the literature in this field is especially important, since authors widely agree on blockchain's significant influence on business models and potentially disruptive impact on industries. Hence, this chapter is closely linked to the first two. At the end of the literature review, the findings are summarized and a theoretical framework for the empirical part is presented.

2.1 Theory of Disruptive Innovation

Since this study engages with the scholarly discussion in the framework of disruptive innovations, an extensive review of the existing literature is required. After the origins of this concept are introduced, this chapter will describe how disruptions evolve, what start-ups' strategies are to disrupt industries and which response strategies incumbents can choose to counter these disruptions. Since regulation and digitisation have a strong impact on disruptive innovations, two subchapters are dedicated to analysing the roles of those.

The disruptive innovation theory was introduced by Christensen (1997), when he distinguished "sustaining" and "disruptive" innovations based on a comprehensive case study of the disk drive industry. While he suggests that sustaining innovations enhance the performance of a certain product and target primarily mainstream customers, innovations of disruptive nature are developed along other value propositions and focus new or different customer segments. The result of disruptive innovation is a product underperforming in the mainstream market at the time of inauguration, but outperforming

the mainstream product in certain attributes such as price, simplicity, and convenience (Christensen, 1997).

The foundations of Christensen's theory are based on findings of previous research conducted in the areas of strategy and organizational theory (Bower, 1970; Salancik and Pfeffer, 1978). Especially the explanation of continuities and discontinuities in technological innovation by Dosi (1982) were fundamental. His study of technological change coined the terms "incremental" and "radical" innovation. The former one represents an innovation within a certain technological paradigm, whereas the latter one goes beyond that, introducing a newly emerged paradigm. The introduction of the term "architectural innovation" by Henderson and Clark (1990) reflects another important basis of the disruptive innovation theory. They claim that architectural innovations, similarly to disruptive innovations, can have a devastating impact on incumbents since they undermine their value propositions.

While the initial implications of the disruptive innovation theory are still valid today, different authors proposed improvements and refinements to Christensen's theory (Danneels, 2004; Markides, 2006; Nagy *et al.*, 2016). Most notably, Markides (2006) claims that disruptive innovations need to be further grouped into three categories: disruptive technological, product and business-model innovation. His reasoning builds on the dissimilar target markets, challenges and managerial implications, which each of the three comprises. As an example, business-model innovations usually focus on expanding existing markets, while radical product innovations target new markets resulting from a supply push. Admittedly, this implies different challenges for managers, which again require specialized coping strategies (Markides, 2006).

2.1.1 Evolvement of Disruptions

Disruption can be explained in a three-step process (see Figure 1). In the first step, an underperforming product is introduced, which aims at new markets with new value propositions. In the second step, the performance in regards to traditional attributes is improved through investments, so that it in the third step outperforms and replaces the incumbent product in the mainstream market (Christensen, 1997). This subchapter will explain these three steps in more detail so that a holistic picture about the process can be attained.

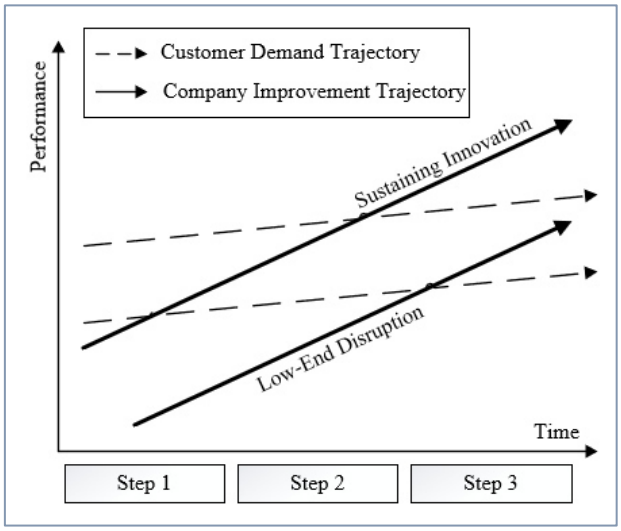

Figure 1: Evolvement of Disruptive Innovations, Source: Christensen et al. (2004, p. XVI)

In the first step, an underperforming product aims at overshot customers. Overshot customers refuse to pay a premium for a higher performance-level, which does not further enhance the perceived value of the product (Christensen *et al.*, 2004; Adner and Zemsky, 2006). Additionally, the newly introduced characteristics such as convenience disrupt customer behaviour, encouraging previous non-customers to buy (Markides, 2006). In this early stage, the motivation/ability framework can be utilized to discover potential disruptions. In this framework, Christensen (2004) indicates that disruptions are more likely in industries, where incentives and capabilities to innovate are considerable. These factors are influenced by both typical market factors, and non-market factors such as standards, norms, and government regulations.

In the second step, differences between new entrant and incumbent company evolve on both sides of this framework. Since the entrant is improving its product in this stage, asymmetries in motivation and ability evolve. Consequently, the incumbent companies identify the new competition in the low-end market, and either attempt to compete in this segment or to fly up-market. Incumbent companies predominantly choose the latter option, because they struggle to compete with new entrants as described by Christensen's RPV-theory. This theory depicts that a company's resources, processes and values shape its competitiveness in a certain area. Since the incumbent's resources, processes, and values are not aligned with the new opportunity, they rather abandon the lower segment and aim at more premium customers instead (Christensen *et al.*, 2004). Gilbert and Bower

(2002) support this observation, while exemplifying this issue with the disruption of Kodak, and further demonstrate that framing plays an important role in the second stage of the disruption process.

In the third step, the new product outperforms the incumbent one in regards to the traditional attributes, so that the competition consequently takes place in the premium segment as well, where the incumbent company cannot move upmarket. Since the new product is additionally superior in regards to other attributes such as convenience and price, and since the resources, processes and values of the incumbent company remain unadapted to compete with the new entrant, the incumbent product rapidly loses market share (Christensen *et al.*, 2004).

Although this trajectory has been confirmed by several case studies conducted in the last two decades (Christensen, 1997; Christensen and Tedlow, 2000; Ansari *et al.*, 2016), research has identified several success factors. In the early days of the scholarly discussion, the extent of the technological change was described as the reason, why the incumbent's situation deteriorates (Tushman and Anderson, 1986; Henderson and Clark, 1990). However, Christensen claims that the issue rather lies in the disability of a firm to amend its strategy and to appropriately allocate their resources than in technological incompetence (Christensen and Bower, 1996). In addition to that factor, he proposes that competitive value networks – the organizational design of a company – can be decisive for success and failure as well. Both factors are based on Christensen's case study of the disk drive industry (Christensen and Rosenbloom, 1995).

In conclusion, the three-step process of disruption builds the basis for every future research in this field, and it is crucial to consider that success depends not just on technological, but also on managerial capabilities of a firm. For this reason, the next chapter will explain the disruptive strategies of start-ups, before the potential response strategies of incumbents are explained.

2.1.2 Disruptive Strategies of Start-Ups

Undoubtedly, start-ups differ from big companies in a variety of ways: they possess different resources, face different challenges and address these challenges in a particular way. Therefore, this section will first introduce the challenges start-ups are facing, before ways of formulating disruptive strategies are explained. Subsequently, two

commercialization strategies are illustrated, and viewed in the context of the start-up's environment.

Less than ten percent of all start-ups survive the first years after founding or provide positive financial returns to its founders at some point (Bhide, 2000). This is mainly due to the unique challenges start-ups are facing, which can be classified into three different areas. Firstly, the lack of capital may stem the growth of start-ups. Even though venture capital firms provide funding, they require a fast and high return on investment (Bergset and Fichter, 2015). Secondly, early-stage entrepreneurs are confronted with high economical, technological and regulatory uncertainty. This uncertainty further increases because limited resources prohibit comprehensive market research ahead of founding the venture. Lastly, start-ups frequently lack crucial skills and know-how to manage unforeseeable circumstances (Bhide, 2000). Despite these unique challenges, start-ups incorporate certain characteristics threatening especially incumbent companies' positions. Young firms are able to innovate more freely and creatively because they do not need to justify their approaches or report to superiors. Additionally, they frequently do not follow a planned strategy, but rather coordinate their actions as emerging circumstances demand (Downes, 2013).

While a higher degree of freedom might spur disruptive innovation, the flexible strategy is essential to increase competitiveness throughout the process of disruptive innovation. Mintzberg and Waters (1985) distinguish two processes of strategy formulation: deliberate and emergent strategies. A deliberate strategy is formulated in advance based on holistic data about a firm's markets and implemented top-down. In contrast to this, an emergent strategy evolves from day-to-day decisions through a bottom-up approach. When circumstances are likely to change rapidly, strategies tend to be formulated bottom-up to maintain flexibility. Especially in the early stage of a venture, the emergent strategy permits the necessary freedom. At a later stage, the switch to a more deliberate strategy is required to enable the growth of the disruptive start-up (Christensen and Raynor, 2003). Ansari *et al.* (2016) confirm this view in a study about disruption in the U.S. television ecosystem. This study showed that TIVO as a start-up was forced to adjust its strategy continuously to secure incumbents' support and to minimize spill-over effects of actions on other ecosystem partners.

As Figure 2 illustrates, usually both types of strategy formulation can be recognized at the same time within one company in a process of continuous adjustment. They confluence in the resource allocation process, which then determines the actual strategy through investment in certain new products, services, processes, or acquisitions. These funded initiatives can be defined as strategic actions (Mintzberg and Waters, 1985). In this context, it is also important to link these two different planning processes to the two types of innovation. Deliberate planning favours sustaining innovations. Here, assumptions are established in the first step, the strategy is developed based on the assumptions in the second step before the strategy is implemented in the third step. However, an emergent strategy in combination with discovery-driven planning aids disruptive innovations. Discovery-driven planning requires the introduction of financial targets as the starting point in the first step. Next, the critical assumptions are developed, which need to be fulfilled to reach these targets. Finally, the assumptions are tested, before the strategy is implemented through aligned investments (Christensen and Raynor, 2003).

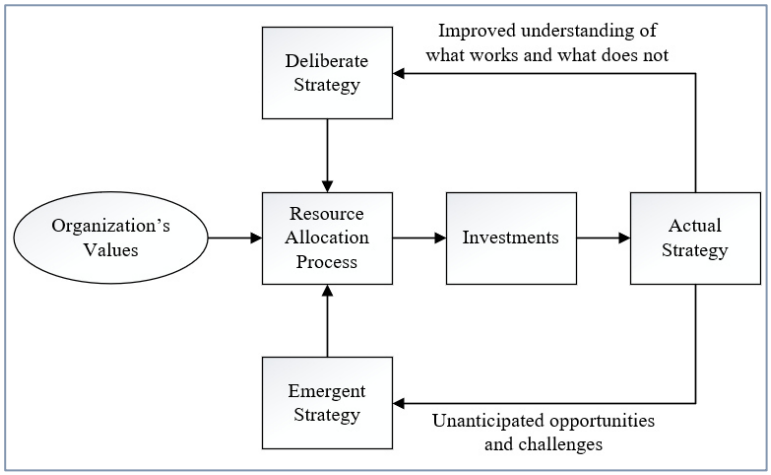

Figure 2: Strategy Formulation Process, Source: Christensen and Raynor (2003, p. 215)

In regards to the actual commercialization strategy of innovations by start-ups, two different forms can be distinguished according to Gans and Stern (2003): the competition- and the cooperation-strategy. The competition-strategy depicts that the start-up builds a new value chain and penetrates the market independently. Consequently, high investments need to be made, and new customers attracted, even though the resources are scarce. On the other side, Christensen (1997), as well as Henderson and Clark (1990), argue that the competition strategy offers the opportunity to develop technological capabilities more effectively. In contrast, the cooperation-strategy leverages an established value chain in collaboration with an incumbent company. Hence, the initial investments are lower, and the customer base of the incumbent can be leveraged. However, the disclosure of intellectual property to an incumbent company can lead to tensions. The inherent paradox of disclosure evolves from the need to disclose

information to an opposed party in a negotiation, but the disclosure of this information weakens the disclosing party's position (Arrow, 1962).

Based on previous findings from Teece (1986), Gans and Stern (2003) argue that the choice of the commercialization strategy is dependent on the commercialization environment. This environment can be separated into the excludability environment and the complementary asset environment. The former one illustrates the ability of the start-up to preclude incumbents from imitating the innovation. This can be achieved either by IP protection or by technological complexity. The other factor, the complementary asset environment, is defined by the level the incumbent's assets influence the value proposition of the start-ups' innovation (Gans and Stern, 2003).

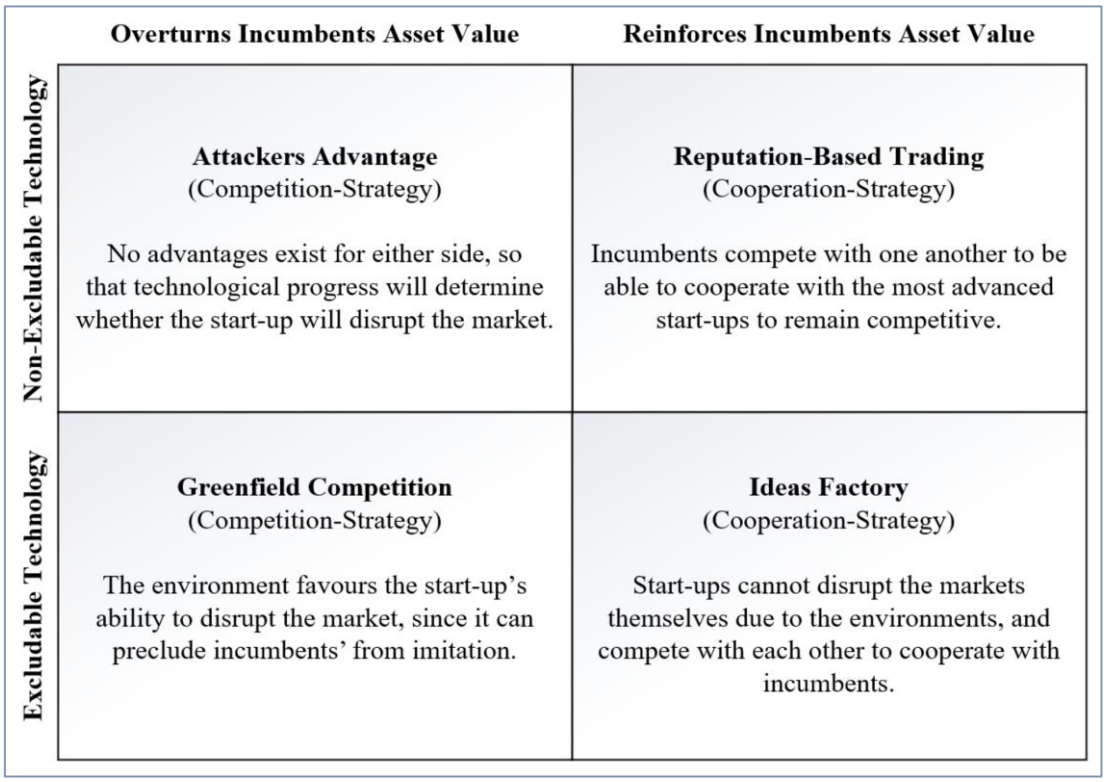

Figure 3: Impact of Commercialization Environment on Commercialization Strategy, Source: Gans and Stern (2003, p. 341, modified)

Figure 3 links the commercialization strategies with commercialization environments. Four different competitive dynamics evolve: "the attacker's advantage", "ideas factory", "reputation-based trading" and "greenfield competition" (Gans and Stern, 2003, p. 340). While "greenfield competition" is most favourable for disruptive start-ups, it is virtually impossible to diffuse disruptive innovations independently in case of an environment termed "ideas factory". In the latter case, the established company owns the assets required to commercialize the innovation, and thus start-ups tend to focus on research

while commercializing their innovations through partnerships with incumbent companies (Arora *et al.*, 2001; Gans and Stern, 2000). In this scenario, the primary question is not which commercialization strategy is chosen, but how and when the cooperation is executed. Instead of disrupting the established firms, the start-ups reinforce the value proposition of these companies. Gans and Stern (2003) further claim that before the cooperation is entered, the feasibility of the technology needs to be demonstrated. On the other side, incumbents utilize the ideas of disruptive start-ups to enhance their competitive advantage.

2.1.3 Response Strategies of Incumbent Companies

After the strategies of start-ups in the context of disruptive innovation were explained in the previous chapter, this chapter introduces possible response strategies of incumbent companies to react to entrants with disruptive potential.

Scholars agree upon the notion that incumbent companies frequently struggle to remain competitive in the event of disruption in their industry (i.e. Christensen and Rosenbloom, 1995; Dedehayir *et al.*, 2017; Hill and Rothaermel, 2003; Rothaermel and Hill, 2005; Tushman and Anderson, 1986). Nevertheless, appropriate strategic choices can help them to remain competitive while facing disruptive new market entrants. Christensen (1997) claims that the reason for the failure of incumbent companies is a bias towards certain management practises. These companies' innovations focus primarily on the traditional target customers, so that consequently the needs of these customers primarily impact the new product development. This assumes that customers can always pronounce their needs, which is not necessarily true. However, disruptive innovations focus on the latent needs of customers such as convenience, which cannot be clearly expressed by customers. Furthermore, shareholders of incumbents typically demand high growth, forcing the company only to target larger markets, and to neglect smaller ones with enormous, but highly uncertain growth potential (Christensen and Raynor, 2003).

In the same study, the author gives advice for managers as well. Nevertheless, before implementing response strategies straight away, the potential impact of a disruption has to be analysed. On the one hand, the tools described in Chapter 2.1.1 such as the RPV-theory or the motivation/ability-framework can be utilized to attain a better understanding of an industry's future (Christensen *et al.*, 2004). On the other hand, additional concepts should be taken into account to analyse the extent of a disruption on a particular company.

The model of the "extendable core", which was introduced by Wessel and Christensen (2012), systematically evaluates the influence of a disruption on a company's business model in a three-step process. In the beginning, the value proposition of the disruptor and the relative value proposition of the own company need to be diagnosed, before in the final step the extendable core is analysed. The extendable core of the potentially disruptive new entrant is described as "the aspect of its business model that allows the disruptor to maintain its performance advantage as it creeps upmarket in search of more and more customers" (Wessel and Christensen, 2012, p. 58). This core can be analysed by assessing different barriers of disruption in the areas momentum, technology-implementation, environment, and business-model.

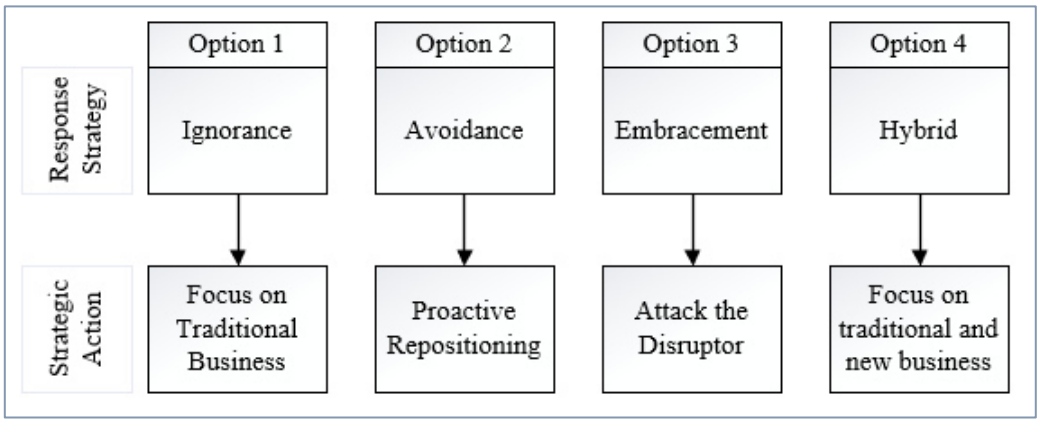

Figure 4: Response Strategies of Incumbents, Source: Own Creation

A large share of the research in the scholarly discussion about disruptive innovations has focussed on incumbent's response strategies (Chandy and Tellis, 2000; Markides and Oyon, 2010; Markman and Waldron, 2014; Wessel and Christensen, 2012). Figure 4 clusters the different strategies into four groups by the direction of the response and by the action plan chosen to remain competitive.

The first option can be defined as "Ignorance". Despite the disruptive impact of an innovation, a company is not always forced to react, as already explained in the context of the extendable core. As Charitou and Markides (2003) proved with a case study of the airline industry, disruptors sometimes might capture market shares quickly, but never capture the whole market. Furthermore, a disruption might target the incumbent's industry, but not its market. Consequently, the target customer of the incumbent is not affected by the new entrant, even though the new entrant attracts new customers. These two scenarios do not necessarily require the incumbent to react, so that the focus can be

kept and intensified on the traditional business (Charitou and Markides, 2003; Christensen, 1997).

Adner and Snow (2010) introduced "Avoidance" as the second option, arguing that an incumbent company can evade a disruption by proactively repositioning their offering in the market. They base their argumentation on the heterogeneity of customer demands, which allow the repositioning of the traditional offering into a niche, where the new entrant is not (yet) competitive. As another strategic action, some researchers have proofed that incumbents can avoid disruption for a certain period of time by aggressively investing into traditional capabilities (Adner and Kapoor, 2016; Chen *et al.*, 2010; Utterback, 1994).

The third option "Embracement" summarizes different strategic actions, which focus on adopting the disruptive innovation in a particular way. Christensen (1997) recommends that incumbents should create and spin-off a start-up, which is equipped with the required resources and autonomies to develop solutions to face the disruption. The proposed action of O'Reilly and Tushman (2016) builds up on this strategy, but rather suggests organizational ambidexterity as a solution, meaning that dual structures should enable a focus on both traditional and new markets. This approach contradicts with the argumentation of Christensen and Raynor (2003), which highlight that an independent organizational unit is necessary to capture the value of disruptive innovations.

Furthermore, a disruptive innovation can be embraced by co-opting with these new entrants. Markides and Geroski (2004) indicate that – especially in regard to disruptive product-innovations – established companies should not attempt to develop disruptive products themselves, but rather invest into promising firms and create a network of start-ups. When the market matures, the incumbent can acquire the remaining shares of the entrant to consolidate the market and scale-up the operations. This perspective is confirmed by a number of scholars (Christensen and Alton, 2011; Kapoor and Klueter, 2015). Instead of the acquisition of start-ups, incumbents can also choose to license their technology or to collaborate with them in the form of a strategic partnership (Marx *et al.*, 2014). The latter option illustrates a paradox, since both companies would collaborate and compete simultaneously. This relationship is further elucidated in Chapter 2.2.

The fourth option to react for incumbents is a "Hybrid-Strategy". This means that they embrace the disruptive innovation partially but focus on sustaining innovation at the same

time (Furr and Snow, 2015). This strategy is especially applicable in uncertain market conditions when, for example, a market transitions into the next generation of a certain technology. The effectiveness of this strategy has been corroborated by case studies in the mobile network and the digital camera industry. In these studies, it was shown that established companies choose to partially base their innovations on new technology, but at the same time improve the established technology along the traditional performance trajectory (Ansari and Garud, 2009; Sandström *et al.*, 2009).

While this chapter confirms that disruptive innovations pose a threat for incumbent companies, it is shown that different strategic alternatives exist to face the disruption. The response strategy is to be chosen depending on a firm's resources and position in a market, the characteristics of the disruptor, as well as the motivation and ability to react (Charitou and Markides, 2003). As Christensen (1997) showed that both the motivation and ability to react are heavily influenced by governmental decisions, the next chapter will elucidate the effect of regulations on both factors.

2.1.4 Role of Regulation in Disruption

Since the empirical part of this study is based on case studies in the energy industry, which reflects a heavily regulated industry, the literature about the impact of regulations on disruptive innovations builds an important foundation for this research (Stenzel and Frenzel, 2008). While the motivation/ability-framework was already introduced in Chapter 2.1.1, this chapter will explicate the impact of government regulation on each side of the framework. At the end of this chapter, the concept will be utilized to explain strategic actions in a case study.

Motivation and ability directly influence the conditions for developing innovative products, services or business models. If both are available, the circumstances support innovations. In comparison to established companies, which focus on sustaining innovations, start-ups are more prone to attack the incumbents with disruptive innovations. Thus, favourable circumstances foster disruption and make markets less predictable for all players. As Figure 5 shows, a two-by-two-matrix,

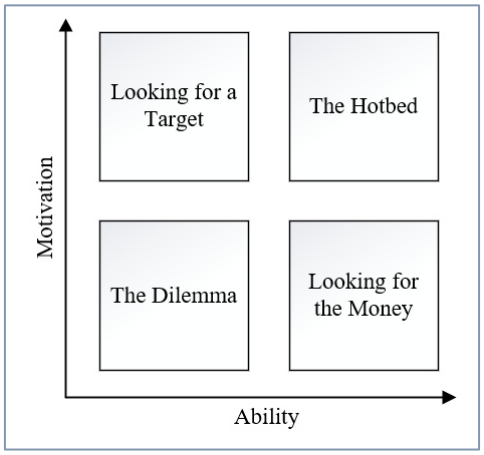

Figure 5: Motivation/Ability-Framework, Source: Christensen et al. (2004)

with scores for motivation and ability along the axes, classifies the factors into four different environments (Christensen *et al.*, 2004). In addition to market factors such as size, growth and access, nonmarket factors can heavily affect the circumstances. More specifically, these factors include industry standards, technological advancements, and most importantly, government regulations. Governments can utilize levers such as tax treatments, rate regulations, and competition policies to intervene with the goal to create an environment, which promotes innovation. This environment was coined by Christensen et al. (2004) as "The Hotbed" – the setting where both motivation and ability are high, so that nothing prohibits sustaining and disruptive innovation.

Even though one factor might be underperforming in an industry, the government can take regulatory actions to counter this situation. Influencing the motivation frequently proves to be complicated, since not the lack of motivation directly, but the underlying root causes need to be addressed. And even if these are identified, taking regulatory actions to intervene in the market might entail unintended ramifications. However, enhancing the other side of the framework, the ability factor, through government levers is less difficult – especially if legal barriers are the key bottleneck. If the governments adjust these regulations in favour of innovations, new entrants will appear in the market attacking the incumbent companies (Christensen *et al.*, 2004).

Graffy and Kihm (2014) corroborate the influence, which regulations can have on innovations, with their study on companies in the electric utility market. They argue that regulations in the energy industry are not meant to be seen as legal protections for incumbent companies, because the environment can still change rapidly through new policies allowing start-ups to enter the market with disruptive business models. Moreover, they claim that even in markets where innovative ability is constraint by opposing regulations, disruptive strategies can prove successful, since industries do not remain completely stagnant due to underlying economic, social and environmental pressures (Graffy and Kihm, 2014). Furthermore, in regulated markets companies have the possibility to collaborate with regulators to adjust policies in favour of their ability to innovate. As Stenzel and Frenzel (2008) indicate in their case study of Spanish utility companies, incumbents can proactively impact governmental regulation to align them with their technological strategy. This finding adds an additional perspective to Christensen's explanations: not only can regulators amend regulations to favour innovation, but firms can also collaborate with governments to develop advantageous

regulatory frameworks. This finding applies particularly to emergent markets, as shown by the case study of the renewable energy industry (Stenzel and Frenzel, 2008).

2.1.5 Role of Digitisation in Disruption

As the empirical part of this study takes place in the energy industry, which is heavily affected not only by regulations, but also by digitisation, a sound understanding of the relationship between disruption and digitisation is necessary. Hence, I first introduce the general process of digital disruption, before I explain the specificities of digital platforms and subsequently the options for incumbents to react.

Digitisation has the potential to disrupt all industries, and nine out of ten company leaders admit that they are already engaged in digitisation, while only 16% of all companies have taken measures to prepare for potential digital disruption (Bonnet *et al.*, 2015; Bughin and van Zeebroeck, 2017). "Digital Disruption" evolved as a term for a process, in which digital innovations systematically erode value propositions of companies (Tan *et al.*, 2015). Furthermore, Skog *et al.* (2018) highlight that digital disruption processes create and capture value by recombining resources and disintermediating interactions, leading to wide-ranging effects on the competitive landscape. The special disruptive potential of digital innovations can be illustrated by three factors. Firstly, digitisation enables capital-light business models with highly competitive cost-structures, easing the financing and increasing the flexibility of these ventures (Bughin and van Zeebroeck, 2017; Wessel, 2017). Secondly, the pace of disruptive digital innovation is accelerated due to its programmable nature (Yoo *et al.*, 2012). And thirdly, digitization renders disintermediation through platforms possible, entailing significant effects on incumbents' business (Hagiu and Altman, 2017; Van Alstyne *et al.*, 2016).

According to research from Van Alstyne *et al.* (2016), the emergence of digital platforms has even more powerful implications on the incumbent competition, as these platforms imply new rules of strategy. The study lists four distinct players which form the platform ecosystem: owners, providers, producers and consumers. Own-

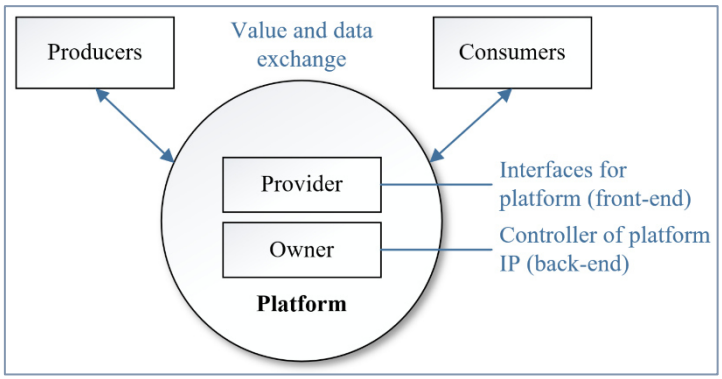

Figure 6: Structure of Digital Platforms, Source: Van Alstyne et al. (2016, p. 6)

ers possess the back-end of the platform, acting as developers and governing body, whereas providers possess the front-end, meaning the user interface and the customer relationship. Furthermore, the platform enables transactions between producers and consumers, as visualized in Figure 6.

The implications of platforms are wide-ranging, decreasing the significance of supply-side economies of scale while increasing the significance of demand-side economies of scale – commonly termed as "network effects". Business models based on digital platforms concentrate on maximizing the participants interacting with each other, instead of accomplishing pure sales growth (Van Alstyne *et al.*, 2016). The threat for incumbents further intensifies, since venture capital firms indicate strong support for platform business models and since these start-ups frequently benefit from "spontaneous private deregulation" (Edelman and Geradin, 2016; Zhu and Liu, 2014). In contrast to the explanations of Christensen *et al.* (2004) about the role of regulation in the last section, Edelman and Geradin (2016) indicate that innovative platforms have the potential to render existing regulations and policies obsolete. As seen in the rise of companies such as Uber and Airbnb, new entrants are frequently overlooked by regulator due to their size, but because of their rapid growth these firms eventually become "virtually unstoppable and even praiseworthy" (Edelman and Geradin, 2016, p. 85).

Because of these unique characteristics of digital disruption as well as platforms, Bughin and van Zeebroeck (2017) propose a modified disruption process, containing two loops. During the first loop, a start-up enters the market with a digital innovation threatening the position of the incumbent. In the second loop, the established companies react to the disruptive threat by co-opting the digital innovation. This leads to increased competition not only between the entrant and the incumbent, but also among the incumbents. Skog *et al.* (2018) confirm this notion, depicting that digital disruption leads to intensified competition between all market participants.

Due to these implications, it is important to specify options for incumbents to react. Bughin and van Zeebroeck (2017) hint that it is advisable for incumbents to react to the threat of digital disruption at scale, meaning not just implementing digital initiatives but incorporating digitisation as a strategic priority. This view is affirmed by Skog *et al.* (2018), although they concede that the rapidity of digital disruption poses an additional threat, making it even more difficult for incumbents to react. Moreover, to fend off new

entrants with platform business models, previous research concordantly recommends established firms to explore these models within their own frameworks (Hagiu and Altman, 2017; Van Alstyne *et al.*, 2016). While Edelman and Geradin (2016) confirm this notion, they exemplify improving existing products and retreating from the market as alternatives, which corroborates the options listed in Chapter 2.1.3. Edelman and Geradin (2016) further add legal actions as a fourth option, in case the new entrant violates existing laws.

During the review of literature in the field disruptive innovation, it becomes clear that previous research has focussed primarily on the process of disruption, the strategies of start-ups to disrupt industries and the response strategies of incumbent companies. Although researchers increasingly focus on the roles of regulation and especially of digitisation in this domain, the literature is still scarce. Consequently, Yu and Hang (2010) call for intensifying the combination of disruptive innovation research with other fields. Furthermore, they indicate the technological perspective as another path for future research. Christensen *et al.* (2018) add that future research should also analyse the performance trajectories of disruptive innovations as well as identifying response strategies of incumbents in more detail. More specifically, they suggest that co-opting and partnering with start-ups requires more attention. Since the collaboration of start-ups and incumbents results in a paradoxical relationship of concurrent competition and collaboration, the theoretical foundations of this phenomenon, called “coopetition”, is explained in the next chapter (Bengtsson and Kock, 2000).

2.2 Coopetition

This chapter introduces the concept of "Coopetition", which combines cooperative and competitive behaviour of firms within one and the same relationship (Bengtsson and Kock, 2000). At the beginning of this chapter, I illustrate the historical emergence of the concept, before the three different research fields in coopetition - "process", "outcomes" and "evaluation" - are separately discussed in subchapters. Subsequently, the special case of coopetition between incumbent companies and high-tech start-ups is discussed, since this reflects the more specific subject of this study's empirical part.

Although different definitions of coopetition exist, scholars widely agree that coopetition describes a phenomenon of simultaneous competition and cooperation taking place between distinct firms to create value (Bengtsson and Kock, 2000; Bouncken *et al.*, 2015; Gnyawali and Park, 2009). The concept stems from the fields of strategy and innovation, where scholars first recognized the phenomenon in 1987 (Hamel, 1991; von Hippel, 1987). Brandenburger and Nalebuff (1996) coined the term "coopetition" and its academic framework by applying game theory to visualize the impact of this paradoxical relationship on value creation and appropriation. They defined the term broadly as a relationship, which contains both cooperative and competitive parts. Although scholars agree that the academic field of coopetition is still in its infancy, and a conclusive definition has yet to evolve, the definition of Bengtsson and Kock (2000) is widely recognized (de Resende *et al.*, 2018; Ritala *et al.*, 2016; Rusko *et al.*, 2018). They define it as "the dyadic and paradoxical relationship that emerges when two firms cooperate in some activities […] and at the same time compete with each other in other activities" (Bengtsson and Kock, 2000, p. 412).

2.2.1 Process: Critical Factors for Success of Coopetition

The process in which coopetition is occurring is complex and paradoxical. Hence, a comprehensive review of the existing literature in this field is fundamental. Firstly, this subchapter categorizes coopetitive relationships in the context of two frameworks to explain the complexity. Secondly, the interactions and tensions are explained to highlight the paradox. Thirdly, the knowledge sharing and protection mechanisms in coopetition are amplified to introduce the practical side of coopetition. Throughout these three sections, the critical success factors for coopetition are extracted, before an overview is given to summarize these factors.

As already explained, coopetition consists of simultaneous cooperation and competition, but not each coopetitive relationship is equal since they vary in the level of intensity and maturity. On the one hand, different coopetitive relationships can be classified depending on the intensity of cooperation and competition (see Figure 7), entailing specific managerial implications for the resulting categories (Luo *et al.*, 2016; Park *et al.*, 2014). Coopetition can be either cooperation-dominated, competition-dominated, or equally balanced between both sides. While Bengtsson and Kock (2000) argue that coopetition is the most advantageous relationship between firms, Luo *et al.* (2016) add that the positive consequences can only be captured if both cooperation and competition are balanced. Balance is achieved if both sides are equally intense. Exemplifying the impact of undesired levels of competition can substantiate this claim: on the one hand, opportunistic behaviour of one party is likely to occur if competition is too intense. On the other hand, the pressure for efficiency and effectivity is limited if competition is too light. Undoubtedly, the opposite can be attested for the intensity of cooperation. Consequently, the first critical success factor can be defined as the **management of coopetitive balance** (Gnyawali and Charleton, 2018)**.** In this context, research has additionally shown that balance is influenced by the customer proximity of activities. While high levels of cooperation frequently occur in activities such as R&D, marketing and sales activities are usually dominated by competition among the partners (Bengtsson and Kock, 2000).

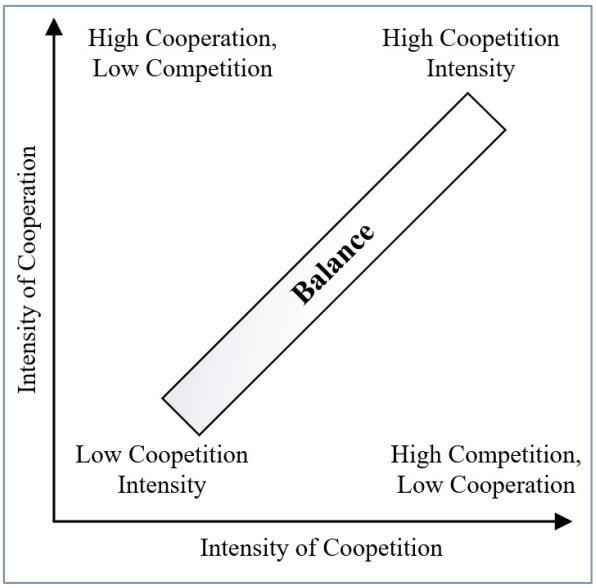

Figure 7: Intensity of Coopetition, Source: Gnyawali et al. (2018, p. 2521)

In contrast to the classification by intensity, Petter *et al.* (2017) introduced the categorization of coopetitive networks by maturity. More specifically, they argue to cluster these by the maturity of inter-relationship and internal factors. With the help of their "Cooperation x Competencies Diagram", coopetitive relationships can be clustered in nine quadrants. These nine quadrants can again be grouped into three maturity levels with

individual managerial implications for each level (see Figure 8). The inter-relationship maturity level (represented on the horizontal axis) can be measured by factors such as **complementarity of synergies**, the **distance of corporate cultures**, as well as **mutual trust and commitment**. The internal maturity is influenced primarily by **innovation competencies** and **intangible assets** of each party (Petter *et al.*, 2014). Petter *et al.* (2017) claim that coopetition has the highest impact on a firm's competitiveness if both levels reach maturity. The critical influence of the individual factors on the success of a coopetitive relationship has been validated comprehensively by the research community. While Bengtsson and Kock (2000) and Hora *et al.* (2018) prove that it is important that the synergies of allied firms are complementary and that innovation competencies play an important role, Lin and Sun (2010) and Niu (2015) affirm that low cultural distance helps to maintain a positive relationship between the partners involved in a coopetition. Moreover, Jaouen (2009) supports that intangible assets such as brand recognition and patents are critical for the success of coopetition.

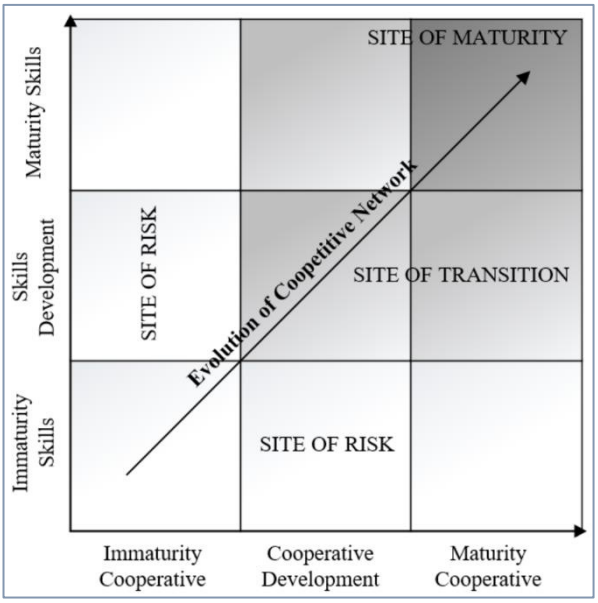

Figure 8: Evolution of Coopetitive Networks, Source: Petter et al. (2017, p. 49)

Besides clustering the different types of coopetition, research in this area has also extensively focussed the inherent interactions and tensions. Tensions evolve, because of the diverging interests as a result of concurrent cooperation and competition (Gnyawali *et al.*, 2016). Competition implies that a person prioritizes its own goals acting individually. In contrast, cooperation means that individuals collectively follow a common goal. Both relationships characterize coopetition, since competitors join forces to create value and compete to capture value. These opposing logics potentially lead to role conflicts in the value creation phase, and to opportunistic behaviour in the value appropriation phase (Gnyawali and Park, 2009; Ritala and Hurmelinna-Laukkanen, 2013). Thus, Bengtsson and Kock (2000) claim that a particular activity needs to be either fully cooperative or fully competitive. They further suggest two ways separation could take place: based on value chain or business units. While the former one builds on

functional aspects, the latter one considers markets and product areas for the separation. As tensions can result in conflicts, rivalry and even hostility between the partners, **management of coopetitive tensions** can be defined as another critical success factor (Chen *et al.*, 2007; Gnyawali and Park, 2011). More specifically this factor conflates relationship management, the navigation of value creation intent, and the protection of each partner's core - the knowledge and skills which are not supposed to be shared (Gnyawali *et al.*, 2016; Gnyawali and Charleton, 2018).

Since these knowledge sharing and protection mechanisms are essential to a coopetition's success, **proactive knowledge management** reflects another critical success factor. On the one hand, the complementary knowledge of each firm is important for joint value creation. On the other hand, protection mechanisms need to be integrated into value creation processes to prevent leakage of core knowledge (Bouncken *et al.*, 2015). Since scholars agree that inter-organizational management of knowledge is challenging (Chevallier *et al.*, 2016; Estrada *et al.*, 2016; Salvetat *et al.*, 2013), it is important to define in detail "what to share, with whom, when and under which conditions" (Levy and Powell, 2003, p. 4). Knowledge can be differentiated into two categories: general and specific. While general knowledge describes knowledge about industries, markets or fields such as marketing, sales or logistics, specific knowledge includes internal information, confidential product information or experiences (Gast *et al.*, 2019; Gnyawali *et al.*, 2006). While coopetitors share general, non-classified knowledge, specific knowledge is usually kept confidential (Enberg, 2012). Jensen and Meckling (1992) argue that this behaviour can be attributed to the fact that general knowledge can be acquired easily, whereas specific knowledge is crucial to a firm's competitiveness.

Previous research has furthermore shown that companies predominantly rely on legal protection mechanisms including contracts such as non-disclosure agreements (Salvetat *et al.*, 2013). These contracts articulate the areas of knowledge sharing to facilitate a mutual understanding of the coopetition and to prevent opportunistic behaviour of one party (Lacoste, 2014). To further mitigate the risk of knowledge leakage, firms additionally implement informal protection mechanisms such as internal policies (Fernandez and Chiambaretto, 2016). In practice, this can be executed by proactively restraining the contact between key employees of the partners and limiting direct communication between firms, as well as by preventing meetings in own facilities (Gast *et al.*, 2019). The extensive research in this area in connection with these findings

highlight the critical influence of **proactive knowledge management** on the success of coopetitive partnerships.

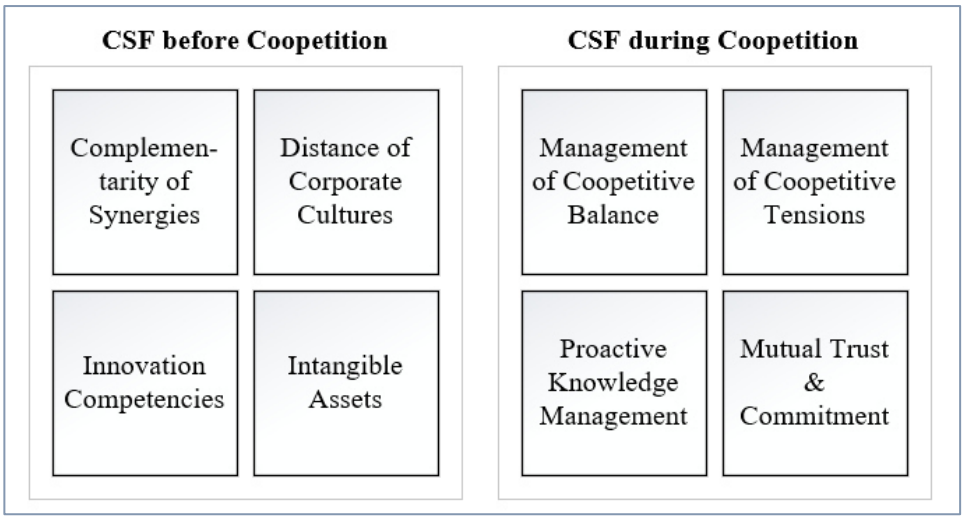

Figure 9: Critical Success Factors of Coopetition, Source: Own Creation

The identified critical success factors (CSF) are summarized in Figure 9. While all of them are important for the joint value creation of the coopetition partners, some of them primarily influence the success before the coopetition starts, while others can only be impacted during the coopetition. In this context, it is important to add that the success factors play a different role depending on the constellation of the coopetition. While some might be highly important for relationships among incumbent companies, they might be less significant for cooperative alliances between incumbents and disruptive start-ups, as Chapter 2.2.4 will assess.

2.2.2 Outcomes: Impact of Coopetition on Innovation Performance

Besides analysing the process of coopetition, a considerable amount of research has been conducted to analyse the impact of coopetitive partnerships on innovation outcomes (Bouncken and Kraus, 2013; Bouncken *et al.*, 2015; Nieto and Santamaría, 2007; Quintana-García and Benavides-Velasco, 2004; Ritala, 2012). In the beginning, the possible outcomes of coopetition are introduced. Next, this chapter will discuss the findings of previous research, which tested the influence of coopetition on innovation in general and, more specifically, on incremental and radical innovation. Finally, the reasons for these findings will be briefly explained.

At the end of a coopetition, two different outcomes are possible: value creation or value destruction. Both can take place on firm-level, meaning for each firm separately, and at a joint level, meaning summarized for all parties. Whether value is created or destructed

depends largely on the availability of the previously described critical success factors (Gnyawali and Charleton, 2018). The creation of value is primarily executed through the connection of the complementary skillsets of each involved parties (Gnyawali and Park, 2011). Gnyawali and Charleton (2018) outline that navigation of the value creation intent is an important part of the management of coopetitive tensions, because an unequal value creation on firm-level could result in a deteriorating relationship with eventually detrimental outcomes on the joint-level. As a consequence, value destruction could occur, whereby costs (i.e. loss of investments, litigation costs) offset benefits.

The positive relationship between coopetitive alliances and innovation outcomes of firms has been extensively analysed. Both qualitative and quantitative studies have demonstrated a positive correlation. Table 1 summarizes the findings of these studies and gives a brief overview of the previous research.

Author	**Finding**
Bengtsson and Kock (2000)	They suggested that balanced levels of cooperation and competition in a relationship positively affect the technological innovation outcomes.
Bouncken and Kraus (2013)	They hint that radical innovation may benefit from knowledge sharing, so that coopetition is particularly beneficial in case of high technological uncertainty.
Bouncken *et al.* (2018)	They analysed the effectivity of coopetition in different phases: pre-launch and launch. They conclude that for incremental innovation, coopetition is beneficial in both phases, but for radical innovation only in the launch-phase.
Nieto and Santamaría (2007)	Their quantitative studies analysed the novelty of innovations with different kind of collaborators – clients, suppliers, research institutes and competitors. They found a negative correlation between novelty and collaboration with competitors, while collaborations with other players indicated positive correlation.
Park *et al.* (2014)	Their study indicates that coopetition with medium-intense competition is more productive in regard to innovation outcome than very light or low intensities in competition.
Pereira and Leitao (2016)	They provide quantitative evidence for the significantly positive impact of coopetitive partnerships on a firm's product innovation outcomes.
Quintana-García and Benavides-Velasco (2004)	Based on their quantitative study of coopetition in the biopharmaceutical industry, they found evidence that coopetition positively influences the innovation capabilities of firms.
Soriano (2016)	They claim that high levels of simultaneously intense competition and collaboration outperform other kinds of firms in regard to innovation.

Ritala and Hurmelinna-Laukkanen (2009)	Their study supports that coopetition between partners in high-tech sectors is likely to result in radical innovations.
Ritala (2012)	His quantitative study indicates that coopetition has a better innovation outcome in highly uncertain markets. Furthermore, he claims that coopetition is more beneficial with less intense competition.
Ritala and Sainio (2014)	Their quantitative study suggests a negative correlation between coopetition and technological radicalness, but a positive correlation between coopetition and business-model radicalness.
Yami and Nemeh (2017)	They conducted research with high-tech companies and also distinguished radical and incremental innovation in their findings. They argue that multiple coopetition is more effective for radical innovation, while dyadic coopetition for incremental innovation.

Table 1: Previous Findings of Coopetition and Innovation, Source: own creation

While the overview uniformly confirms the positive relationship between coopetition and innovation performance of a firm, authors have analysed different specificities in their studies. One perspective has focussed on the impact of different intensity levels of cooperation and competition on innovation outcomes. Soriano (2016) claim that high-levels of simultaneous cooperation and competition maximize a firm's innovation performance, while Park *et al.* (2014) and Ritala (2012) repudiate this claim. Instead, they argue that low or moderate levels of coopetition are more beneficial for innovation outcome. Another perspective has categorized innovation based on their novelty in two groups – incremental and radical – and analysed the impact of coopetition on those individually. The study of Nieto and Santamaría (2007) introduced the negative link between coopetition and novelty of innovation. Ritala and Hurmelinna-Laukkanen (2009) first integrated the concept of radical innovation in this research area, claiming that coopetition in high-tech industries is likely to result in radical innovation. This claim was refined by Ritala and Sainio (2014), specifying the positive relationship only for business-model radicalness, while a negative effect on technological radicalness was shown.

The studies of Bouncken *et al.* (2018), as well as of Yami and Nemeh (2017), offer explanations for the partially contrary findings. The former one finds that radical innovation only profits from collaboration with competitors in the later stages of the product development process due to the reduced uncertainty. However, incremental innovation benefits from coopetition also in earlier stages, since the inherent uncertainty is typically lower for this type of innovation.

Yami and Nemeh (2017) further specify the impact of coopetition on incremental and radical innovation, taking the role of social capital into account (see Figure 10). Social capital means the role of trust and commitment in the context of inter-organizational relationships. This factor was already identified as a critical success factor for coopetition in the previous chapter. Their case study of the ICT-sector individually analysed multiple and dyadic relationships, because they exhibit divergent characteristics. As a result, Yami and Nemeh (2017) demonstrate that dyadic coopetitive partnerships are more beneficial for incremental innovation, while coopetition among multiple partners is most effective for radical innovation. The explanation for this observation lies in the distance to the client. Since incremental innovations are developed typically with high proximity to the end customer, the level of trust between the partners in the coopetition needs to be higher, so that dyadic relationships for this kind of projects are preferred (Yami and Nemeh, 2017).

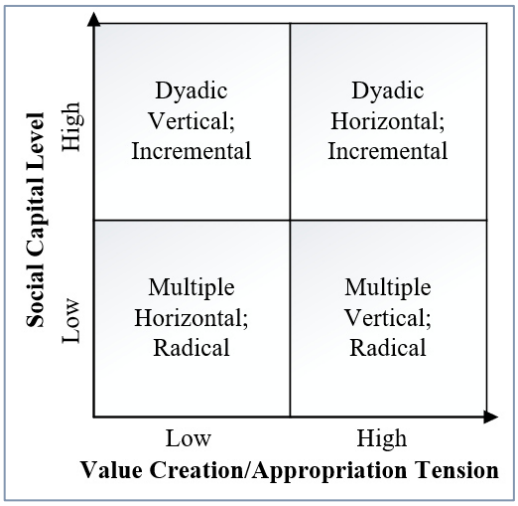

Figure 10: Social Capital x Value Creation Matrix, Source: Yami & Nemeh (2017, p. 258)

The overall confirmed positive impact of coopetition on innovation outcome is due to different reasons. It is argued that the main cause for this observation is the combination of complementary knowledge, skills, and resources to decrease knowledge asymmetries (Brolos, 2009; Gnyawali and Park, 2009). As a further explanation, the different benefits of coopetition will be outlined in the next chapter

2.2.3 Evaluation: Risks and Benefits

As already introduced, it is argued that "Coopetition" describes the most beneficial relationship between competitors (Bengtsson and Kock, 2000). This chapter will summarize the benefits to illustrate the advantages. Furthermore, the risks are explicated to highlight both sides of coopetition.

The overall aim of coopetitive relationships is to strengthen each party's competitiveness (Levy and Powell, 2003; Ritala and Hurmelinna-Laukkanen, 2013). The most important benefit this particular kind of alliance entails are synergies. Synergies can be achieved by combining complementary resources to overcome knowledge gaps, enhancing the

capability to develop new products. Furthermore, synergies can be achieved by splitting investment costs, exploiting economies of scale, and pooling R&D activities (Bengtsson and Kock, 2000; Gnyawali and Park, 2009; Gnyawali and Park, 2011). In regard to business development, Petter *et al.* (2014) add that the capability to identify and capture opportunities is improved through the collaboration, while the risks can be divided among the parties.

The previous chapter already briefly introduced some risks, which go along with coopetition. Firstly, role conflicts evolving from this paradoxical relationship can result in confusion of employees, since they are following divergent goals. Secondly, opportunistic behaviour from one party can result in a deteriorating relationship. Thirdly, the parties are less flexible, since they need to align their operations with those of the other parties involved in the alliance (Baumard, 2009; Dowling *et al.*, 1996).

Because of these important advantages and disadvantages, Bouncken and Fredrich (2012) portray coopetition as a "double-edged sword" (p. 2060). Whereas alliances with competitors have the potential to spur growth, enhance innovation capabilities, and eventually improve the competitiveness, they may also be detrimental for a company in case of opportunism or management mistakes (Bouncken *et al.*, 2015). Previous research on ways to increase the benefits and to mitigate the risks was introduced in Chapter 2.2.1 in the form of eight critical success factors.

2.2.4 Specification: Coopetition between Incumbents and Start-Ups

After I comprehensively discussed the findings of previous research in the scholarly discussion about coopetition in general, this chapter introduces the specificities of coopetition among incumbents and entrepreneurial firms. Since studies in the area of coopetition predominantly focus on partnerships among competing multinationals, coopetition involving smaller firms has been widely neglected by research. Only a few authors considered smaller or entrepreneurial firms. Cozzolino and Rothaermel (2018) provide an explanation under which circumstances coopetition with start-ups is preferred to that with other incumbents. Lechner *et al.* (2016) analyse coopetition among start-ups in the IT-sector, while Soppe *et al.* (2014) investigate coopetition within the German start-up space. Furthermore, findings of studies of Ansari *et al.* (2016) and Hora *et al.* (2018) are particularly interesting as a basis for the empirical part of this thesis, since they conducted research on coopetition between incumbent companies and start-ups. In the

following, I elaborate more on the findings of these studies, categorized in four areas: impact of circumstances, motives, benefits, and management.

The first step of coopetition is the choice of the partner. Cozzolino and Rothaermel (2018) developed a framework, claiming that the choice whether to coopete with a new entrant or an incumbent company is dependent on two factors: asset complementarity and knowledge complementarity (see Figure 11). The study depicts that in case the incumbents resources in the form of assets are replaced by new technologies, it is more effective to collaborate with equally large competitors. In contrast, in case the intellectual property of the established company is rendered obsolete by the technological advances, collaborations with competing new entrants are more effective. Circling back to the previous chapter, Gans and Stern (2003) confirm this reaction to core-knowledge discontinuities. Furthermore, several studies corroborate the claim that incumbents can counter these conditions most effectively by collaborating with these new entrants, accessing their innovative knowledge and exploiting complementary synergies (i.e. Teece, 1992; Williamson, 1991).

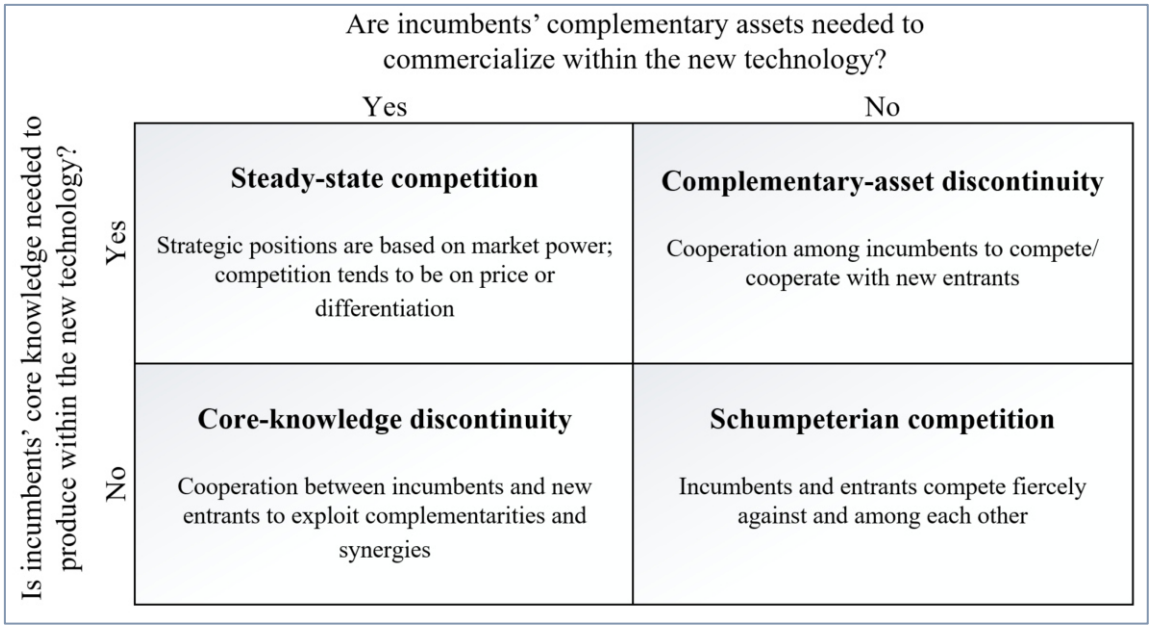

Figure 11: Impact of Circumstances on Cooperation and Competition, Source: Cozzolino (2018, p. 3059)

Adding to the presented framework, Cozzolino and Rothaermel (2018) argue that the stability of the collaboration between incumbent and new entrant diminishes over time. The study further claims that the decline in stability correlates with the reduced degree of complementarity of assets and knowledge. This reasoning is affirmed by studies from Dyer *et al.* (2018) as well as Hamel (1991).

Apart from exploiting complementarities of assets and knowledge, start-ups and incumbent companies also pursue individual aims for engaging in coopetition. Hora *et al.* (2018) find that start-ups primarily seek to boost their growth by overcoming resource constraints, as well as to increase their publicity. In contrast, incumbents intend to benefit from a start-up's innovation capabilities and intellectual property of new technologies. As a consequence of the high complementarity, this coopetition between start-ups and incumbents is particularly beneficial for each party, creating value both on the joint- and on the firm-level (Freeman and Engel, 2007; Weiblen and Chesbrough, 2015).

Obviously, the choice of partners is influenced by this complementarity, but additional factors are taken into account by each party. Hora *et al.* (2018) claim that entrepreneurial firms aim to maintain their independence and to have aligned visions with the incumbent. However, for the incumbent company, the start-up's strategic fit is primarily determined by its products, experience, and know-how. These factors have been widely affirmed by research on coopetition among multinationals (Bengtsson and Kock, 2000; Petter *et al.*, 2014). Nevertheless, the management of tensions in coopetition between start-up and incumbent needs to respect one more circumstance. Whereas for equal coopetition partners only need to manage dyadic tensions as a result of the paradoxical relationship, Ansari *et al.* (2016) introduce the concept of intertemporal tensions in the context of unequal coopetition. Intertemporal tensions describe a conflict between short-term pain and long-term gain. More specifically, their study found that the costs and efforts for incumbents to collaborate with start-ups will occur in the short-term, but the benefits will only be visible in the long-term. Moreover, their study concluded that the fundamental benefit of this inequal coopetition for the established company is the survival of the industry disruption. Marx *et al.* (2014) corroborate the claim of Ansari *et al.* (2016) and Hora *et al.* (2018) that strategic partnerships with disruptive start-ups – a coopetition per definition – can be beneficial for incumbents,

This chapter began with defining the term "coopetition" before it highlighted eight critical success factors, while discussing academic findings of the process of coopetition. In the second part, this chapter gave an overview of the empirical results of studies, which conducted research on the relationship between coopetition and innovation outcome. It was shown that a positive relationship is widely confirmed, although certain authors argue that coopetition is more beneficial for incremental than for radical innovation. The third section outlined the risks and benefits inherent in this sort of relationship, before the last

section focussed on the literature on coopetition between start-ups and incumbents, linking this scholarly discussion with the one about disruptive innovation theory.

The review of literature on coopetition reveals several discoveries. First and foremost, it becomes clear that the field is still in an early stage, since both qualitative and quantitative literature is sparse, and a uniform definition has yet to evolve. Both firm-level and industry-level drivers of coopetition require further exploration (Soppe *et al.*, 2014). Secondly, the field is increasingly focussed by researchers, resulting in rapidly developing knowledge about the phenomenon itself (Bengtsson and Kock, 2014). Thirdly, although the combination of innovation and coopetition is one of the most important research streams in this academic discussion, studies almost exclusively distinguish incremental and radical innovation, omitting the distinction between sustaining and disruptive innovation.

These three discoveries led the authors to formulate several future research opportunities. Clearly, one opportunity is concentrating studies on coopetition among start-ups, as well as between start-ups and incumbent companies (Bouncken *et al.*, 2015; Ritala *et al.*, 2016). Another opportunity represents the further exploration of the impact of the commercial environment on coopetitive partnerships (Soppe *et al.*, 2014). Furthermore, future research can utilize the distinction in sustaining and disruptive innovation made by Christensen (1997) and analyse how coopetition promotes the diffusion of disruptive innovation. Lastly, the field coopetition and disruptive innovation can be combined even more by further exploring coopetition as an incumbent's reaction to disruptive innovation (Rusko *et al.*, 2018). Since it is argued that blockchain-technology is an example of such a disruptive innovation, the next chapter will introduce its technological background and its potential impact on businesses (Swan, 2015).

2.3 Blockchain-Technology

The term “Blockchain” describes the information technology underlying Bitcoin – the first cryptographic currency introduced by Nakamoto (2008). Although this emergent technology has been undergoing rapid innovation since its introduction, its three fundamental parts persist: a distributed ledger, cryptographically secured data, and a consensus-mechanism, which enables trust among untrusted parties (Hou *et al.*, 2018; Swan, 2015). As both academics and professionals widely agree on the disruptive potential of blockchain technology for a variety of industries (Chen, 2018; Hukkinen *et al.*, 2017; Morkunas *et al.*, 2019; Swan, 2015), this chapter elucidates its evolution, and takes the technological as well as the business perspective on this new type of information technology.

2.3.1 Evolution of Blockchain-Technology

The term “blockchain” evolved because viewed on a higher-level, this system bundles multiple transactions into a block, which is encrypted through a secure algorithm and subsequently linked to the foregoing block, resulting in a chain of blocks (Nakamoto, 2008). Its evolution can be grouped into three stages (Swan, 2015).

The first stage was Bitcoin, published in 2008, which enabled the intermediation of payments by using a cryptographic currency. The Bitcoin-blockchain does not feature a programming language. Consequently, its use cases for companies are limited. In the second stage, Buterin (2013) changed this by developing Ethereum, a blockchain featuring smart contracts. Smart contracts can be viewed as programmable contracts, which are triggered by certain actions of network participants. Since smart contracts enable the programming of decentralized applications, first use cases for instance in the financial services industry were identified. The third stage is characterized by the emergence of new, specialized types of blockchain in recent years, promoting use cases in different industries (Swan, 2015). Examples of this are Ripple, a solution for the banking industry, or Hyperledger Fabric, a flexible solution for a variety of industries and applications. In particular, the latter example has attracted attention since its introduction, as it is developed by the Linux Foundation in collaboration with leading software companies such as Cisco, IBM, and SAP. Additionally, Walmart and JP Morgan Chase are currently piloting use cases with this blockchain (Ripple Labs, 2016; The Linux Foundation, 2019).

Although the actual potential of the technology is controversially discussed in recent years, technology experts such as Gartner see blockchain as one of the five most important industry trends (Panetta, 2018). This is supported by Ponciano (2017), who estimated that approximately $4.5 billion were invested in the technology solely in 2017. Additionally, the number of patent applications has grown by 200% in 2017, according to Noonan (2018). Nevertheless, experts agree that the technology has yet to reach mainstream adoption. In fact, Furlonger (2018) showed that only 1% of the surveyed CIOs are conducting adoption projects, while Kandaswamy and Furlonger (2018) argue that large-scale use cases will be introduced earliest in 2022. The long-term potential of blockchain is quantified by Gartner to be $3 trillion by 2030, achieved through cost savings and revenue gains (Kandaswamy and Furlonger, 2018). To discuss the potentially disruptive use cases, the technological foundations are outlined in the next chapter.

2.3.2 Technological Perspective

This chapter lays the technological foundation, while it firstly introduces the core technology, secondly the different types of blockchain and lastly the inherent technological challenges. The brief explanation of this area is important to understand the disruptive potential of the technology.

Blockchain is characterized by three distinct parts, which build the core technology: a distributed ledger, an encryption algorithm and a consensus mechanism (Hou *et al.*, 2018, p. 2061). The distributed ledger describes a decentralized database, which is shared across all parties connected to the system (= nodes) so that each participant possesses an identical duplicate of the ledger. The encryption algorithm builds the second part of the blockchain to ensure a maximal level of security and consists out of two parts. On the one hand, a hash algorithm encrypts information through a principle called “hashing”, so that only restricted parties can decrypt and see a particular piece of information. On the other hand, an asymmetric encryption algorithm enables the creation of unique keys, which are then required to decrypt the information and to sign transactions (Hou *et al.*, 2018). The third part reflects a consensus mechanism, which enables trust among untrusted parties. When the transaction data of a block is changed by a certain node, this change is copied to the ledgers of other nodes These nodes then prove whether this change is legitimate. The consensus mechanism underlying Bitcoin, called “Proof-of-Work”, only approves transactions, if more than 50% of the nodes confirm the transaction. Hereby, the share is measured based on the computational power (Nakamoto, 2008). Consequently, the

consensus mechanism plays a significant role for to defend malicious attacks, since it is very unlikely that one hacker can capture the majority of the system (Azevedo, 2018, pp. 33–34).

Although the terms “cryptocurrency” and “blockchain” are often confused, a cryptocurrency does not represent a fourth core part of the technology, since not all blockchains comprise a native currency (Chen, 2018). More recently published blockchain-frameworks such as Hyperledger Fabric optionally include tokens, which are based on a smart contract (Massey *et al.*, 2018). Tokens can not only represent a currency, but a number of digital assets such as securities, properties, or loyalty points (Buterin, 2013). These tokens can then be traded between parties without an intermediary. Because the supply of tokens is limited, they are also anti-inflationary (Chen, 2018). Tokens can have different functions, and as a consequence, they can impact a business model in various ways (see Chapter 2.3.3).

Different types of blockchain exist, but their three key features usually remain unchanged: decentralization, consensus trust, security and reliability (Hou *et al.*, 2018). Differences exist in scope and in the role of permissions. In regard to scope, blockchains can be either public or private. On public blockchains, such as Bitcoin and Ethereum, all parties are allowed to interact with each other (Buterin, 2015). However, on private blockchains only pre-selected people or groups can join the network and access the system. In regard to the role of permissions, permissioned and permission-less blockchains can be distinguished. Whereas permission-less blockchains imply equal rights for all parties, permissioned blockchains impose certain restrictions on users, so that only certain individuals can read and alter the ledger. The most well-known blockchains – Bitcoin and Ethereum – reflect public permission-less blockchains. However, private and permissioned blockchains were developed to comply with industry regulations and to promote use cases for different industries (Azevedo, 2018, p. 33). As an example, in the banking industry, it is required that the transacting parties can be identified. This is in contrast to Bitcoin, which includes anonymity as one central principle (Xu *et al.*, 2017).

Although blockchain-technology has high potential, it is still in an early stage. Consequently, a variety of technical challenges hamper mainstream adoption so far. Most importantly, the different kinds of blockchain are still facing a trilemma. This trilemma forces a trade-off between scalability, security, and decentralization, so that only two out

of three can be achieved so far (Zhao, 2018). Additionally, the speed of confirming transactions, low flexibility, low standardization, and high energy consumption are discussed as major drawbacks (Tapscott and Tapscott, 2016). However, these challenges are addressed by several institutions, and alternative blockchains have been developed to overcome some of the aforementioned issues (Schatsky *et al.*, 2018). Firstly, new consensus mechanisms such as Proof-of-Stake, Proof-of-Elapsed-Time, and Practical Byzantine Fault Tolerance, led to significant performance improvements while maintaining decentralization and security. Additionally, these new consensus mechanisms displaced "Proof-of-Work" – the mechanism responsible for the high electricity consumption of Bitcoin (Eyal *et al.*, 2016). Secondly, consortia among leading high-tech companies were formed to accelerate the standardization of blockchain. The goal of standardization is to enable the interaction between different blockchains and to reduce implementation costs (Morkunas *et al.*, 2019). Thirdly, regulations are improving to foster blockchain initiatives. For instance, the U.S. government has amended laws to promote the development of medical applications based on blockchain-technology (Pawczuk *et al.*, 2018). Because these positive developments frequently enable new use cases in different industries, the next chapter will focus on the impact of blockchain on businesses.

2.3.3 Business Perspective

Use cases for blockchain can be identified based on the characteristics presented during the analysis of the technological perspective. Hukkinen *et al.* (2017) list factors, which are important for an impactful use case of blockchain. Obviously, a shared database needs to be required, where multiple parties can simultaneously edit content. Furthermore, they argue that trust needs to be absent and intermediation undesired. However, they identify the requirement to maintain consensus regarding the content of the records as key for disruptive use cases. Klein *et al.* (2018) confirmed these factors, and summarized these in a three-step framework.

To analyse the influence of blockchain-technology on companies, Morkunas *et al.* (2019) systematically analysed its impact on different parts of a business model. They concluded that the distributed ledger technology will have a significant impact on key resources, key partnerships, customer segments, value propositions as well as cost structures of firms. The impact of blockchain-technology on key resources is twofold. On the one hand, blockchain-based business models are less capital-intensive, since they can utilize peer-

to-peer platforms. These platforms usually require less capital than traditional ownership models. On the other hand, business models, which are based on blockchains can utilize an easier access to capital. Blockchain start-ups have the possibility to fund their projects through initial coin offerings (ICOs). During an ICO, tokens with a certain utility are sold to individuals, who can then trade these tokens. These tokens can reflect different kinds of digitized assets such as currencies, properties, as well as energy. Opposite to shares sold in an Initial Public Offering (IPO), the tokens sold in an ICO do not represent equity, but usually have a certain utility. In 2016, blockchain start-ups have raised more funding through ICOs than through any other method. Investments in tokens by leading financial services companies such as Goldman Sachs and NASDAQ underline the impact of ICOs (Tapscott and Tapscott, 2017). This new method of fundraising decreases the dependence of start-ups from intermediaries such as investment banks and venture capital firms (Belleflamme *et al.*, 2014; Massey *et al.*, 2018; Mollick, 2014). However, Massey *et al.* (2018) concede that the regulatory framework for ICOs is still in a very early stage in most countries. Consequently, governmental decisions will significantly decide whether ICOs will remain an effective way of fundraising for start-ups in the future.

As another part of a business model, key partnerships are primarily influenced by disintermediation through blockchain-technology. Intermediaries such as banks or currency exchanges can become less important through this technology. Furthermore, Morkunas *et al.* (2019) claims that new partnerships can be enabled through the emergent technology, primarily with software-companies. In regard to the customer segments, Larios-Hernández (2017) argues that new markets can be reached. As an example, he names developing countries, who currently have limited access to financial services. Blockchain further can have a significant impact on the value proposition a company has. The new technology can provide new products and services, which were not possible to create before. Additionally, existing products and services can be enhanced through to introduce new value propositions for the customer. Lastly, the technology can have an impact on the cost structure of businesses (Morkunas *et al.*, 2019). More specifically, blockchain has the potential to achieve savings in the area of transaction costs, which are estimated to be around $20 billion per year in the financial services industry alone (Tapscott and Tapscott, 2017).

The previous analysis shows that different parts of a business model are significantly influenced by blockchain. Additionally, a few studies have been conducted to analyse

which type of innovation blockchain represents. While Morkunas *et al.* (2019) claim that blockchain-projects led to either incremental, architectural or radical innovations in dependence of the application purpose, Hukkinen *et al.* (2017) and Swan (2015) portray blockchain as disruptive. In brief, research about which type of innovation blockchain constitutes is still inconclusive.

This chapter discussed the existing literature in the field of blockchain-technology. In the first step, its evolution was described, before the technological and business perspective were taken to analyse this emergent technology in the second and third step. The review has highlighted that the potential of blockchain is intensively and controversially discussed by both research and practice. However, the majority of this literature has focussed on technological developments and business models based on blockchain. Research has widely neglected the diffusion process of blockchain-based innovations so far. Even though the disruptive potential of blockchain has been superficially introduced by multiple authors, academic research has yet to explore how new entrants can disrupt industries with blockchain-based products, services, or business-models.

2.4 Development of Theoretical Framework

In the scope of the literature review, I introduced the disruptive innovation theory first, before coopetition was discussed as a strategy to diffuse innovations. In the last part, I focussed on elucidating the disruptive potential of blockchain technology. The comprehensive review of previous research enables me to identify gaps.

I discover the most important gap in the literature in the conjunction of disruptive innovation theory and coopetition as a diffusion strategy of and a response strategy to disruptive innovations (Christensen *et al.*, 2018). Leading authors in the field of coopetition more specifically portray collaborations between disruptive start-ups and incumbents as a promising research path (Bouncken *et al.*, 2015; Ritala *et al.*, 2016). Largely omitted by previous research is also the impact of industry characteristics on coopetitive behaviour (Soppe *et al.*, 2014). Additionally, Rusko *et al.* (2018) particularly pronounce the disruptive potential of blockchain as one area to explore coopetitive behaviour. Based on these identified research gaps, I develop a theoretical framework, which summarizes conclusions developed from existing theory (see Figure 12). As this study aims to fill the described research gaps, I revise this theoretical framework based on my empirical findings in Chapter 4.3.

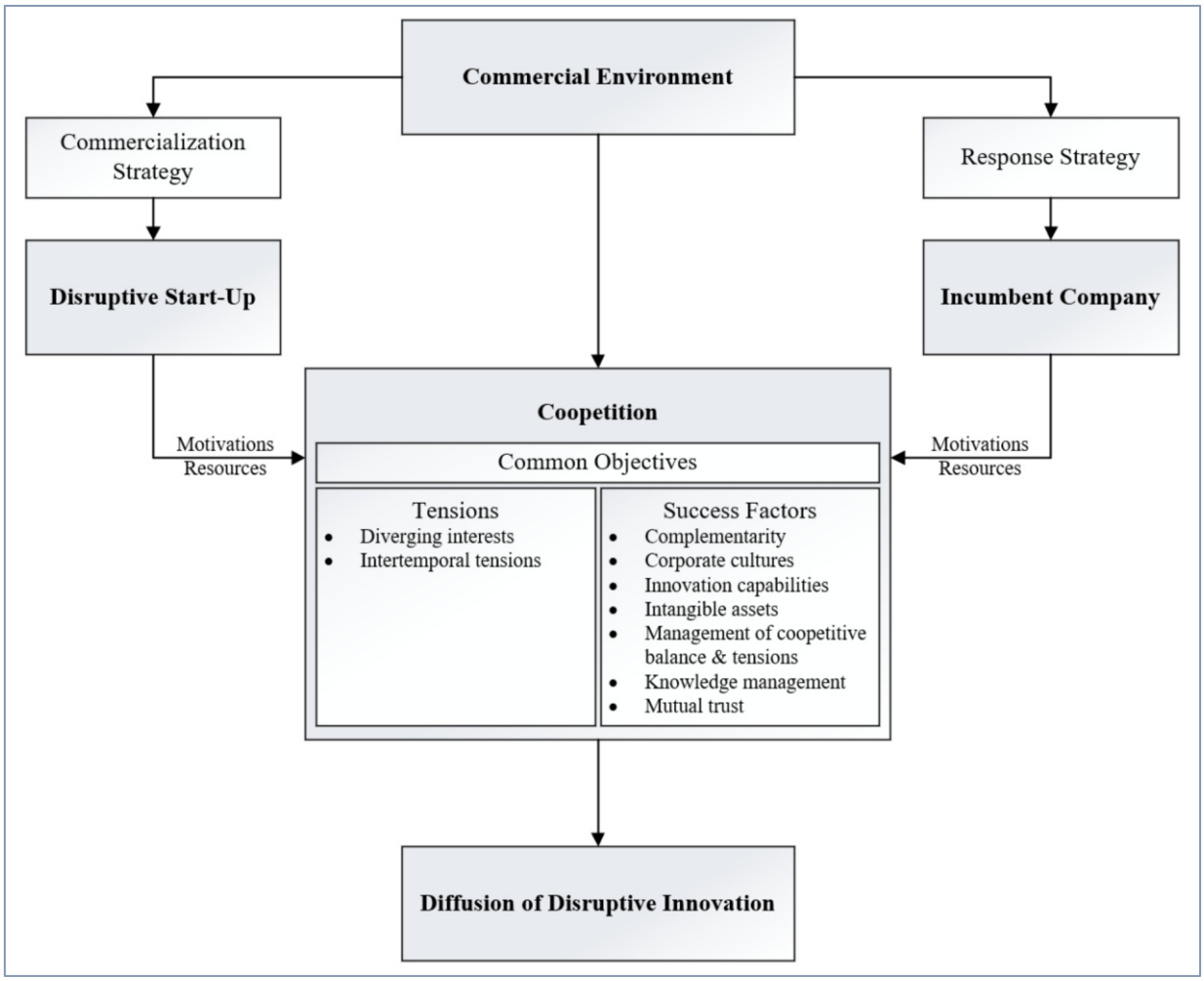

Figure 12: Theoretical Framework, Source: own creation

To guide my research and to develop an appropriate methodological approach, I defined the following research question (RQ):

> *RQ: How are start-ups disrupting a highly regulated industry through coopetitive partnerships with incumbent companies?*

For analysing the different parts of the theoretical framework in a more structured way, I deduce four sub-questions (SQ):

> *SQ1: How does the commercial environment impact the strategies of disruptive start-ups?*
>
> *SQ2: Why do disruptive start-ups and incumbent companies pursue coopetitive partnerships?*
>
> *SQ3: How are coopetitive partnerships between disruptive start-ups and incumbent companies performed?*

SQ4: How do coopetitive partnerships between disruptive start-ups and incumbent companies promote the diffusion process of disruptive innovation?

To fill the research gaps and to answer the contemplated research questions, I develop a systematic methodological approach in the next chapter. This systematic approach aims to maximize the validity and reliability of the findings through a logical and traceable data collection and analysis.

3 Methodology

This chapter explains the methodological foundations of my research. In the beginning, I describe my onto-epistemological viewpoint to position my thesis philosophically, which fundamentally shapes the methodology. Next, I introduce the basics of the multiple case study approach, before I explain its three crucial parts – case selection, data collection and data analysis – in more detail. Lastly, I establish measures for the quality evaluation and introduce ethical principles for research.

3.1 Philosophical Positioning

The choice of the research strategy, as well as the applicable methods, are dependent on the inquiry paradigms of the researcher. The paradigm is based on ontological, epistemological and methodological assumptions, which reflect the author's views of "what is real, what can be known, and how these social facts can be faithfully rendered" (Miles and Huberman, 1994, p. 4). Consequently, I am going to answer these three questions, so that the research strategy can be developed accordingly. From an ontological point of view, I understand the reality as subjective, meaning that each individual perceives the reality differently. However, from an epistemological standpoint, I describe myself as modified objectivist in accordance with the definition of Guba and Lincoln (1994, p. 110). On the one hand, I argue that the reality can only be accessed through personal observations. On the other hand, I think that the aim of research is to maintain a maximum level of objectivity through critical reflections and replications.

Of the four research paradigms defined by Guba and Lincoln (1994), I believe that the post-positivistic paradigm is most aligned with my aims and perspectives. This paradigm emphasizes especially the critical utilization of diverse data sources as well as the data collection in natural settings as important to "contribute to grounded theory" (Guba and Lincoln, 1994, p. 110). My ontological and epistemological perspectives, as well as the identified research paradigm led me to the identification of qualitative research as the most suitable research strategy for this study. Furthermore, Eriksson and Kovalainen (2008) explain that qualitative research is particularly well-suited for research areas, where prior insights are still scarce. Since the literature in the field of coopetition between disruptive start-ups and incumbents is still scarce, the exploratory nature of this study additionally justifies the utilization of qualitative techniques.

Even though qualitative research can be conducted in a variety of forms such as experiments or observations, I argue that the case study approach suits best to the aims of this study. Firstly, case studies follow the onto-epistemological assumptions of the post-positivistic paradigm, meaning that it is aligned with the philosophical positioning of my thesis. Secondly, as the prevalent method in qualitative research, case studies are especially well suited for exploratory purposes (Piekkari *et al.*, 2009). This strengthens my choice, because this study intends to explore a specific area of coopetition, which is still largely omitted by previous research. Thirdly, the nature of my overall research question and of the four sub-questions suggest case studies as the best research approach, because case studies predominantly focus on answering the "how" and "why" (Yin, 1981, p. 100). Finally, Yin (1981) explains that case studies allow research on complex relationships, while it prevents the overgeneralization of contexts. Hence, the case study approach is the preferred method of leading scholars in the field of coopetition as well as disruptive innovation (i.e. Bengtsson and Kock, 2000; Christensen, 1997; Hora *et al.*, 2018).

3.2 Multiple Case Study Approach

Two different designs for case studies exist: single case and multiple case design. While single case studies are only based on one case, multiple case studies are based on a group of cases (Yin, 1981). Piekkari *et al.* (2009) show that trade-offs exist between the number of cases and the richness of each case. While authors such as Yin (1981) or Eisenhardt (1989) claim that multiple case studies are preferred to single case studies, Dyer *et al.* (1991) disprove this view, introducing evidence which substantiates the advantages of single case studies. Stoecker (1991) additionally introduced the distinction between intensive and extensive case studies. Whereas intensive case studies only consider one or a few cases, extensive case studies take more distinct cases into account. Although these different types of case studies and its propositions are extensively discussed in academic research, the choice is primarily dependent on the aims of the study as well as its onto-epistemological assumptions. Single or intense case studies are preferred for understanding a specific case in great detail. In contrast, multiple or extensive case studies are applicable to identify patterns across different cases, and to generate and replicate theory (Eriksson and Kovalainen, 2008).

Based on the applicability of the different designs, I choose to conduct a multiple case study in an extensive design for several reasons. To start with, I choose four cases since the purpose of this study is to add to the literature in this field by identifying patterns through a cross-case analysis. Furthermore, the consideration of multiple cases allows the substantiation of the deduced theory, since triangulation and replication can be utilized to bolster the validity of the findings. Lastly, since coopetition is a highly complex and paradoxical phenomenon as described in Chapter 2.2, I believe that understanding a single case in-depth is not sufficient to offer a comprehensive explanation and to answer the research questions.

The empirical part of this study utilizes the multiple case study approach as outlined by Eisenhardt (1989), as it suits well to the above-stated aims and as it is predominant in the research community with more than 17,000 citations. The highly systematic and logical procedure is elucidated in the next sections, focussing on the case selection, data collection and data analysis.

3.2.1 Case Selection

According to Eisenhardt (1989), two things are crucial for selecting suitable cases for a study: the concept of population and the theoretical sampling. The former describes the sample group, from which the case companies are chosen. The definition of the population aims to reduce "extraneous variation", which enables the cross-case analysis to find patterns in a later stage of this study (Eisenhardt, 1989, p. 537). In contrast to random sampling, theoretical sampling describes the choice of cases based on facts.

To determine the population from which the cases for this research are chosen and to establish comparative grounds as a basis of the approach outlined by Eisenhardt (1989), I deduced several requirements from my research question. Since this study investigates coopetition between disruptive start-ups and incumbents, I determine that (1) the case companies need to represent start-ups with a disruptive product or business-model and that (2) these start-ups need to collaborate with incumbents to diffuse their innovation. Due to the high disruptive potential of blockchain-technology (see Chapter 2.3), several industries are shortlisted, where this innovation potentially has a disruptive impact. Subsequently, I scrutinize whether these start-ups pursue partnerships with incumbents to diffuse their innovation. This leads me to define the population for the theoretical sampling as follows: start-ups in the energy industry developing peer-to-peer energy

trading platforms and collaborating with incumbents, which are likely to be disrupted by the innovation. This clear population definition minimizes extraneous variation to ensure comparability of the cases. As an elementary understanding of the energy industry is required to grasp the disruptive potential of these start-ups and the structure of the coopetitive partnerships, I will briefly introduce the basics in this section.

In the last decades, the energy industry has largely remained the same. The industry has been highly government-driven, so that regulations determined the strategic and operative actions of market participants. Since policies are country-specific, the industry landscape strongly differs across countries. In general, five major stakeholders operating in the industry can be identified (Merz, 2016). On the production side, **energy generators** and **prosumers** supply electricity to the grid. While in the past, large-scale energy generators with centralized power plants dominated the market, in recent years electricity is increasingly provided by decentralized players. These smaller-scale producers, termed "prosumers" as they simultaneously produce and consume, generate electricity, for instance, through photovoltaic-systems. Traditionally, **consumers** were only located on the consumption side of the market. Like in other conventional industries such as retail and leisure, the production and consumption side are connected by intermediary players. **Energy retailers** buy electricity from the producers on the wholesale market and eventually sell it to consumers for a premium. **Grid operators** (also called Transmission and Distribution System Operators or Utility Companies) are responsible for supplying the energy from producers to consumers. These operate the electricity grid and ensure continuity of energy supply to the consumers. Although other market participants exist, I consciously decided not to introduce them as they are not relevant for the purpose of this study. In this context, it is important to note that individual governmental regulations impact the industry landscape and the roles of the participants fundamentally. I discuss this impact extensively in the empirical findings.

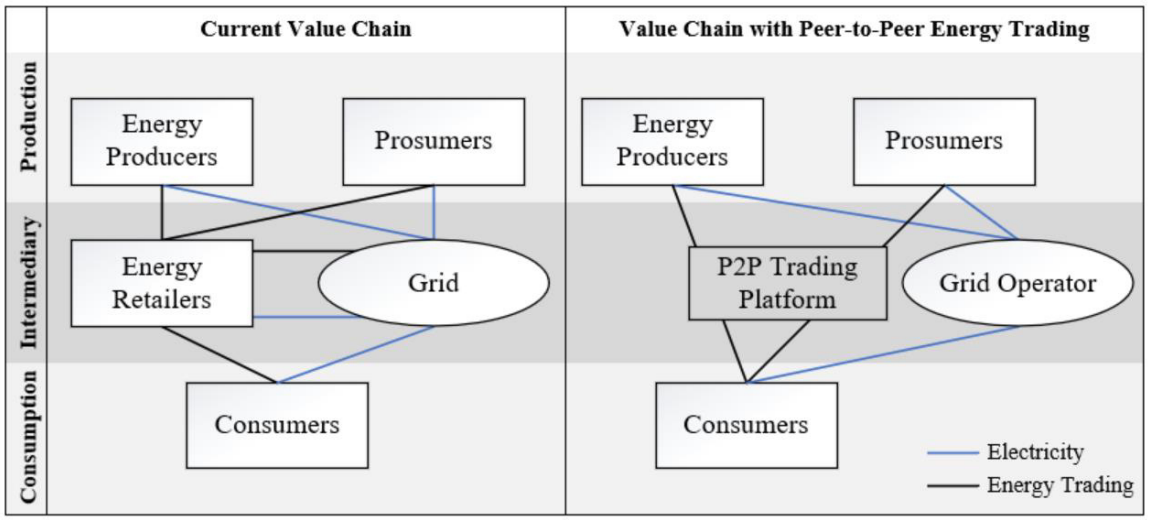

Figure 13: Disintermediation of the Energy Industry by Platforms, Source: Hasse (2018, modified)

While the left side of Figure 13 summarizes the connections of the different industry player in the value chain of the energy industry, the right side illustrates the value chain disintermediated by peer-to-peer (P2P) energy trading platforms. Similar to other P2P platforms such as Airbnb or Uber, P2P energy trading platforms aim to allow the direct connection of production and consumption side. As shown, the P2P energy trading platforms diminish the value proposition of the energy retailers, as their role in the system is replaced by the platform. With this new energy trading platform, peers can directly trade energy with each other, without the need for an energy retailer as an intermediary. This imposes the threat of their business model becoming obsolete on energy retailers. This development can be termed disruptive as it corresponds with what Christensen *et al.* (2004) describe as "development of rules allowing migration of producer toward end-user" (pp. 17-18). In fact, the emergent platforms allow the producers and prosumers to move closer to the end customer, disrupting the business model of energy retailers. Nevertheless, the energy industry is a special case, because the grid operators will remain involved as intermediaries for maintaining the grid, even though the energy trading will happen directly from peer-to-peer. As the industry expert Michael Barnard explained: "the only way P2P trading could work is if the utility agrees that it works".

The second disruptive development evolves from the fact that P2P energy trading platforms allow producers and prosumers to directly trade their surplus energy with consumers. Hence, consumers can consciously decide from which producer and consequently from which energy source they procure their electricity. In reality, this means, for instance, that neighbours could purchase energy directly from each other. As

a result, consumers can base their purchasing decision not only on conventional product characteristics such as price and quantity, but also on new traits such as locality and sustainability. Even other criteria could be made possible as the Business Development Manager of Start-Up U explained: “It does not have to be local clean energy. It can also be energy that was produced by people of a certain think-group”. This highly corresponds with the definition of disruptive innovation by Christensen (1997): “disruptive technologies underperform established products in mainstream markets, but they have other features that a few fringe (and generally new) customer value” (p. 11).

Because of these two disruptive characteristics, I argue that P2P energy trading platforms are a disruptive innovation in the energy industry. Furthermore, I claim that these platforms pose the greatest disruptive threat to energy retailers. Threatened by the start-ups’ innovation, the energy retailers may respond to the disruption with retaliation. However, I discover that both parties collaborate. This simultaneously occurring cooperation and competition represent the phenomenon of coopetition (Bengtsson and Kock, 2000). Therefore, I define start-ups which develop or deploy this platform, and which collaborate with energy retailers as the population for the theoretical sampling. An overview of this space is gained by utilizing both material from market research institutes as well as peer-reviewed literature (i.e. Andoni *et al.*, 2019; Barnard, 2018).

After the population is defined, the cases for the study need to be selected. While no optimal number of cases exists, Eisenhardt (1989) argues that between four and ten cases are sufficient. Furthermore, due to the constrained number of cases, it is recommended to only choose the ones, which are likely to generate new knowledge about a specific phenomenon. More specifically, Yin (2009) distinguishes three different types of cases for individual purposes: “critical” cases for the testing of hypotheses and theories, “extreme” cases for describing unique circumstances, and “revelatory” cases for developing new theory. As the aim of this study is to add novel insights to existing literature, I decide to choose “revelatory cases”. Furthermore, certain criteria are established for the case selection to minimize extraneous variation:

(1) The start-up has a blockchain-based P2P energy trading platform as a main product.
(2) The start-up is not older than 10 years and has a proof-of-concept (POC) or minimum viable product (MVP).

(3) The start-up collaborates with incumbent companies classified as energy retailers or utility companies (termination is dependent on regulatory environment).

After these criteria have shortlisted a number of companies, I decide to choose four companies to ensure that the trade-off between case number and richness as described by Piekkari *et al.* (2009) is marginal (see Appendix 1 for shortlist). To reflect different geographic environments in my case study, I decided to choose start-ups from Australia, Estonia, Singapore, and the United States. Furthermore, based on publications and industry reports, I select the four leading companies in this segment. To adhere to high ethical standards of research and to maintain the anonymity of the case companies, I decided to pseudonymize their names. According to the location of their headquarter, I call the case companies Start-Up A, Start-Up E, Start-Up S, and Start-Up U. Each start-up, its strategy as well as its coopetitive partnerships are separately introduced in Chapter 4.1. The choice of these four case companies is in line with the recommendations of Eisenhardt (1989) and Yin (1981) and enables an appropriate data collection and analysis in the next steps, maximizing both validity and generalizability.

3.2.2 Data Collection

One particular strength of the multiple case study method is the simultaneous collection and analysis of data. (Eisenhardt, 1989). Hence, I describe these two parts of the chosen process in the following sections. In the data collection phase, it is particularly recommended to utilize diverse methods and sources. Methods such as interviews and archival sources are primarily considered for case study research (Eisenhardt, 1989). Jick (1979) emphasizes that triangulation - the use of several points of reference - enhances the validity of findings. However, Yin (1981) hints that the magnitude of data from various sources for each case may constitute a significant challenge for the researcher.

Before I started the data collection, I planned what kind of data was needed and how this data could be collected. Based on the research question and the four sub-questions, I concluded that data about the start-ups themselves, their environment, their strategy and their coopetitive partnerships with incumbents was required. To get more acquainted with these areas, I collected publicly available information in the form of whitepapers, reports and blog entries first. In fact, due to the high public interest in these start-ups, comprehensive first insights could be attained.

Nevertheless, as publishing information may impact the price of the tokens sold by the start-ups in their favour, I chose to conduct interviews myself to obtain a more balanced perspective. For the interviews, I decided to approach both the strategy or business development leader of the aforementioned start-ups and industry experts. With this approach, I was able to gain insight into two important perspectives. Firstly, the perspective from the start-up by interviewing the employees who are directly involved in the coopetitive partnerships. Secondly, a neutral perspective from the outside by interviewing industry experts, who possess the overview about the whole industry. However, this is in contrast to the argumentation of Tidström and Rajala (2016), who claim that it is preferable to interview both parties involved in coopetitive partnerships. Even though I do agree in general with this opinion, I argue that this is not necessarily applicable for this study, because the overall research question primarily aims on the perspective of the start-up. Moreover, I claim that I am able to attain rich information about the incumbents' perspective through the secondary data analysis as well as the interviews I conducted.

As aforementioned, due to the novelty and potential of peer-to-peer energy trading platforms, the public interest in these start-ups is very high. Additionally, due to their limited resources and strong growth, the availability of employees for interviews is limited. Nevertheless, I was able to arrange interviews with leaders of each start-ups' strategy or business development department. Overall five comprehensive interviews with these employees were conducted. Additionally, I arranged selective follow-up talks so that questions are answered, which came up during the ongoing analysis. This approach might seem to contrast with the claim of Jick (1979) who argues for multiple points of reference. Nonetheless, I was able to triangulate the findings of the conducted interviews with several datapoints: In addition to the five start-up interviews, seven published interviews with the leaders of each start-up are taken into account, since they elucidate their perspectives on similar topics as well as confirm the statements of their employees. Furthermore, I chose to interview Michael Barnard as an industry expert, who has rich experience as a blockchain consultant in the energy industry and worked for the leading information-technology company in this segment.

All interviews were conducted in semi-structured form, leaving room for flexibility and targeted follow-up questions, as recommended by Eisenhardt (1989). The guideline of the interview focused on three topics: the start-ups themselves, their strategies and their

collaborations with incumbents. However, a slightly different guideline was applied for the interview with the industry expert, as it aimed to give another perspective (see Appendix 2 and 3 for interview guidelines). Since the interviewees were spread globally from Australia to Canada, all interviews were conducted via a digital application. Upon the agreement of the experts, all interviews were recorded with a voice recording application, which eased the transcription and enhanced the verifiability of the obtained information. The length of the interviews was between 50 minutes and two hours.

According to Eisenhardt (1989), the data collection can be stopped once saturation is reached. This means that the incremental learning from additional interviews is minimal. As I conducted six comprehensive interviews and several follow-up discussions with the strategy managers of leading start-ups as well as an industry expert in addition to secondary data, I claim that I reached saturation. Overall, the six conducted interviews in addition to the seven publicly available interviews (see Table 2) and other available secondary data, fulfil the quality aspects of Eisenhardt (1989) and Yin (1981).

Overview about Interviews	
Interviews with Start-Ups	
Electrify	Strategy Leader
LO3 Energy	Business Development Leader
Power Ledger	Business Development Leader
WePower	Chief Marketing Officer
WePower	Chief Information Officer
WePower	Marketing Manager
Archive Interviews with Start-Ups	
Electrify	Chief Operating Officer (Youtube)
Electrify	Chief Operating Officer (Youtube)
LO3 Energy	Business Development Leader (Soundcloud)
Power Ledger	Co-Founder, Managing Director (Youtube)
Power Ledger	Co-Founder, Managing Director (Youtube)
WePower	Co-Founder, CEO (Youtube)
WePower	Co-Founder, CEO (Youtube)
Interviews with Industry Experts	
Michael Barnard	Experience: Blockchain Expert with a focus on Renewable Energy Industry

Table 2: List of Interviewees for the Data Collection, Source: own creation

3.2.3 Data Analysis

The data analysis represents the second part of the introduced iterative process of case study research. To create the data analysis plan for my research, I primarily draw on procedures outlined by Eisenhardt (1989), Thomas (2006) and Yin (2003). According to the recommendation of Eisenhardt (1989), I decided to collect and analyse data simultaneously to fully leverage the advantages of flexible data collection. Through this overlap, I was able to focus on special opportunities in more detail. Hence, I noted down seemingly surprising or unusual findings during the interview, so that I could ask targeted follow-up questions to deepen my understanding of these statements.

Scholars agree that analysing data of case studies is the most important as well as the most challenging and least codified part of this type of qualitative research. Therefore, it is essential to follow a clear analytical strategy, to utilize an applicable technique and to create a logical procedure. As an analytical strategy, I decided to primarily follow one of the three strategies outlined by Yin (2003), which is labelled 'relying on theoretical propositions' (pp. 112). Not only is this the generally preferred strategy, but also does it fit to this study in particular. This study is guided by a theoretical framework derived from the review of existing literature. The identified research gaps are again reflected in the main research question and its four sub-questions. Furthermore, I claim that the strategy of Yin (2003) is most suitable for my research because my data collection plan was also developed on these research questions. For the analytical technique, I selected 'cross-case synthesis' as outlined by Yin (2003, pp. 133–134). This technique fundamentally describes the process of combining several cases to derive one concept of those. Based on the described analytical strategy and technique, I argue that the analytical procedure outlined by Eisenhardt (1989) fits best to my objectives, as it draws on strategic and technical foundations of Yin. Moreover, this procedure is aligned with the epistemological perspective underlying this research. The four-step process is briefly visualized in Figure 14.

Step 1 **Within-Case Analysis**	Step 2 **Cross-Case Analysis**	Step 3 **Identification of Patterns**	Step 4 **Creation of Construct**
Extensive write-ups for each case to become intimately familiar with each one.	Comparison of cases to discover similarities differences as well as cross-case patterns.	Thematical identification and discussion of emerging patterns in light of existing literature	Iteration between empirical data, emerging patterns and existing literature to create an overarching framework

Figure 14: Data Analysis Plan, Source: Eisenhardt (1989, modified)

In the first step, each case was analysed separately to develop a deeper understanding of each case. To deal with the high volume of data, Eriksson and Kovalainen (2008) suggest to create case records for the individual cases. Thus, I created a file for each case, which contains all primary and secondary data, grouped both by theme and by source to enhance manageability. The preliminary themes were derived from the sub-questions of this research: (1) commercial environment, (2) motivation of start-ups and incumbents, (3) coopetition process as well as (4) impact on innovation diffusion.

Next, I chose to code the data drawing on the general inductive approach conceptualized by Thomas (2006). This approach summarizes the raw data, so that conclusions can be drawn and verified. The coding is conducted in five steps. In the beginning, the raw data files are prepared, before the texts are read in-depths to identify the sections relevant for the research question. Afterwards, the categories are developed building upon the specific passages. Lastly, the overlap between categories is reduced, so that clear constructs can be derived. I selected the inductive procedure because it is a straight-forward technique coherent with the patterns introduced by Miles and Huberman (1994) and consistent with my onto-epistemological assumptions as a critical realist. The case files were created and coded with a scientific software called "Atlas.ti" to enhance the manageability of the magnitude of data. The coding results in 14 categories with an overall 84 codes (see Appendices 4, 5 and 6).

In the second step of the data analysis, I utilized the themes and categories developed in the previous step to compare the cases and to identify patterns. To ensure a good cross-case comparison and to avoid biases, Eisenhardt (1989) suggests that a systematic tactic should be applied. In accordance with this recommendation, I used the categories to search for similarities and differences among the cases. To establish an overview of the different cases, I followed the suggestion of Miles and Huberman (1994) to display the insights in matrices. Additionally, I applied semi-quantitative analyses to count the frequencies of codes for different factors. This is in line with the recommendation of Eisenhardt (1989) to utilize different kinds of evidence and to combine different types of data. Coherent with the notion of Petter *et al.* (2014), I follow a systematic process in conducting the analyses. The frequency count is based on the answers of the interviewees to very specific questions regarding motivation and critical success factors. While I refrain from claiming that the counted frequencies are accurate due to the dissimilar lengths of the interviews, I argue that this analysis supports the primary objective of my

coding approach to "allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data" (Thomas, 2006, p. 238). Hence, the primary insight given by these charts for the cross-case analysis is the identification of "elements that remained constant across the four cases" (Sutton and Callahan, 1987, p. 411). The precise frequencies only play a secondary role, as the risk of distortion due to the dissimilar length of the interviews persists. Overall, this structured approach in comparing across the four cases increased the probability to extract novel theory from the raw data with both high validity and reliability.

Next, the emerging patterns were identified and discussed for each of the themes. Based on the previously identified similarities and differences, I explained the emerging patterns, before I unfolded findings of previous research, which either support or contradict with those. Eisenhardt (1989) highlights that researchers should not only take literature into account which corresponds with the new findings, but also literature which contradicts those. Taking opposing literature into account firstly creates the opportunity to gain deeper insight into the emergent theory. Secondly, it enhances the credibility and the generalizability of the new findings, since opposing arguments are considered pre-emptively. In the last step, I created a construct based on the discussed emergent patterns, modifying the initial theoretical framework. With the help of this theoretical framework, I aim to answer the research questions of my thesis.

According to Eisenhardt (1989) the data analysis process can be stopped once saturation is reached. In this context, saturation means that the incremental enhancement of the emergent theory or concept is minimal. I decided to end the data analysis when I was confident that the fit of the novel concept with the collected evidence is appropriate, so that validity and reliability can be ensured. To establish a general understanding of these evaluation criteria, the next section introduces quality aspects and ethical concerns of scientific research.

3.3 Evaluation and Ethical Concerns

The highly structured approach described in the preceding sections aims to maximize the quality of the research and to adhere to ethical concerns. A high level of quality and ethics is important to be maintained not just during the data collection phase, but throughout the whole research process (Eriksson and Kovalainen, 2008).

Although no general measures exist to assess the quality of this kind of research, several authors have introduced different evaluation criteria. In correspondence with my onto-epistemological perspective, I chose to evaluate my study with the criteria suggested by Eisenhardt (1989, p. 548) and Yin (2003, p. 34), which are summarized in Table X.

Yin (2003)	
Construct Validity	Establishing the right operational measures for the studied concepts
Internal Validity	Establishing a causal relationship, in which certain causes lead to certain effects
External Validity	Establishing the field for which the results of the research can be generalized
Reliability	Showing that repeating the research procedures such as data collection and analysis lead to same results
Eisenhardt (1989)	
Fit with Data	Showing a structured analytical approach, which connects evidence with findings and pre-empts rival explanations
Newness	Showing new insights, which enhance existing theories or even break frames

Table 3: Evaluation Criteria of Scientific Research, Source: Eisenhardt (1989) and Yin (2003)

Through triangulation by using multiple data sources in the form of primary and secondary data, I ensure high construct validity. Furthermore, the highly structured data analysis as described in the previous section increase internal validity. The internal validity is additionally enhanced because I took contrary literature into account and address rival explanations. The external validity is maximized by following the iterative data collection and analysis procedure as outlined by Eisenhardt (1989) as well as pursuing a logical approach in the cross-case analysis. Additionally, as I selected the leading blockchain-in-energy start-ups as case companies, I was able to increase the generalizability. Lastly, I maintained reliability by developing a study protocol consisting of the interview guides, the transcribed interviews, and the coding scheme, which enables within-case- and cross-case-analysis.

As defined by Eisenhardt (1989), I assure a good fit of the emerging patterns and constructs with the data, since I followed a rigorous tactic. Before I started searching for cross-case patterns, I identified themes as well as code groups, which guided the pattern identification. This tactic again maximizes the probability that reliable and accurate theory emerges. To additionally increase the likelihood of generating novel findings, I meticulously analysed previous research in the field of disruptive innovation and

coopetition theory to focus my study on the identified research gaps. Because of this focus, I was able to generate new insights, which add to the existing theory.

Several organizations such as the IFER (International Foundation for Ethical Research) and the ISA (International Sociological Association) have developed guidelines and codes to define ethical research. According to Eriksson and Kovalainen (2008) ethics in research are applicable not only for the data collection process, but for every step in the research process and for every kind of research. All issues ranging from the research ideas over empirical operations to the writing process and publication need to take research ethics into account.

One important topic in research ethics is *informed consent*. This means that the participants of the study should be aware of the fundamentals of the research. This goes in line with the principle of *voluntary participation*. I took these two factors into account, since I informed all participants about the research topic and the voluntary participation in advance both in the written communication and at the beginning of each interview.

Furthermore, *confidentiality* is an important ethical topic in research. As aforementioned, to increase the reliability I prepared study protocols consisting for instance of interview transcriptions. This might seem to contradict with the principle of confidentiality, but I argue that I ensure this principle, because I mentioned at the beginning of each interview, that the study does not target to obtain any confidential company data. Furthermore, I asked the interviewees to not respond in case they are uncomfortable with answering a certain question. Moreover, I asked every participant at the beginning of the interview, whether they accept to be recorded.

The fourth principle is *professional integrity*, which implies that analysis and arguments are written in a logical way. This is critical, so that outsiders can easily observe the coherence within the thesis. My highly structured research design does only fulfil quality aspects but is also essential to ensure this professional integrity. Lastly, I ensured ethical behaviour and avoid practises such as *silencing* and *plagiarism* by carefully citing the original sources as well as by rephrasing statements of other authors (Eriksson and Kovalainen, 2008).

The aim of this chapter was to introduce the methodological approach of my research. In the beginning I highlighted the importance as well as explained my philosophical

standpoint. Subsequently, I defined the crucial steps of the multiple case study approach, before I focussed on quality and ethics. Through the comprehensive explanation of the methodology underlying this research, I intend to establish an understanding of my chosen research design and to achieve verifiability of the findings. These findings will be explained in the next chapter.

4 Empirical Findings, Analysis and Discussion

After the theoretical and methodological foundations for this study were built in the preceding chapters, this section presents the empirical findings of my research. In accordance with the systematic four-step approach outlined on page 51, I begin with presenting the four cases separately to allow the within-case analysis. Subsequently, I proceed with the cross-case analysis, explicating similarities and differences among the cases, before I thematically identify emerging patterns. To ensure a logically coherent presentation and discussion of these patterns, I organise the sections by the four themes of the theoretical framework. In the last step of my analytical approach, I inductively modify the theoretical framework of this thesis based on the identified and discussed patterns.

4.1 Presentation of Case Companies

In the first step of the analysis, I present the findings of each case individually, while each chapter is structured in the same way. First, I introduce general background information about the case company, before I explain the commercial environment it is operating in and its strategy. In the next step, I amplify the start-ups' motivations for initiating the partnership with an incumbent company and the actual collaboration process. Lastly, I present the diffusion process of the start-up's disruptive innovation.

4.1.1 Start-Up A

Founded in 2016, the Australian Start-Up A emerged as a leader in the field of P2P energy trading. Since its inception, the start-up has grown to more than 30 employees by 2019, developed various blockchain applications for the energy industry and won a global start-up competition with its innovative solution offering. Furthermore, the enterprise raised approximately USD 24 million through its token sale in 2018. Its most mature application is a P2P energy trading marketplace, which enables prosumers and consumers to connect and trade energy. Based in Southwest Australia, the start-up operates not only domestically, but also internationally in Japan, Southeast Asia and the United States.

Start-Up A recognizes the commercial environment, especially the complex regulatory frameworks, as its most important challenge. The Co-Founder and Managing Director explains that "it is not so much a tech challenge, but a cognitive challenge. No one we have talked to has said it will not or should not work". The start-ups' Business Development Leader (= BDL) further elaborates "P2P trading is not even considered by

the regulations, meaning the 'how to' rules are yet to be written. In an industry as heavily regulated as the energy industry, rules are king". While this statement shows the significance of the commercial environment in the energy industry, the BDL highlights that the non-existence of policies represents a substantial market entry barrier for Start-Up A.

As briefly mentioned in the previous chapter, regulations vary across different energy markets, particularly regulated and deregulated markets can be distinguished. Interestingly, Start-Up A operates in both environments. Although most of the firm's projects are executed in Australia, a deregulated energy market, the firm has started to expand to Southeast Asia, a highly regulated energy market. For the regulated environment, the BDL of Start-Up A explicates that "not all energy markets are contestable. In some markets, there is no more than one retailer". Here, he alludes to the state-owned utility company, which centrally acts as an intermediary between consumption and production side, so that competitive energy retailers are not required. In these regulatory frameworks, the model "energy retailer" is not stipulated, thus not allowing energy retailers to enter the market. In contrast, in deregulated environments, competitive energy retailers exist. For this environment he outlines the challenge that "emerging as a competitor, you are up against organizations with a lot of capital. If you enter the market as a retailer in a contestable market, then the other retailers will more than likely see you as a threat and it's very unlikely that you would get […] market share". Furthermore, he emphasizes that in both environments access to electricity distribution and transmission systems as well as to production and consumption data is required for successfully deploying their P2P energy trading platform.

To cope with those different commercial environments, Start-Up A develops two distinct solutions. When it is operating in a regulated environment, the start-up's platform is tailored to the needs of energy retailers, so that these can enhance their existing product offering. For deregulated environments, the start-up directly targets consumers with its platform solution. However, as even in Australia, one of the most deregulated energy markets, the regulations have yet to evolve for P2P energy trading, the latter concept is so far only applicable for microgrids behind the meter. In simple terms, a microgrid behind the meter is the electricity system within one building, household or company. Nevertheless, to deploy its solution also at the main electricity grid, the BDL states that short-term his firm aims "to fit in with the existing rules and regulations to solve problems

in the electricity sector today without waiting for further regulatory change". Supporting this statement, he explicates that "holding your breath and waiting for regulatory change is not so good".

The interviewee further points out that the start-up is continuously in conversations with regulators, to give recommendations on how energy markets can be structured in the future. However, he admits that "regulatory change is very difficult" and even "extraordinarily difficult if not impossible if you are a small company". He amplifies the process of the discussions with regulators: "they are very cautious in regard to new regulations. And they want to make sure that all parties in the market are at least aware or in agreement with the new regulations". As policy changes in the energy industry possibly result in spill-over effects, which potentially benefit or harm one party disproportionally, these changes are difficult to accomplish.

While as aforementioned the short-term strategy of Start-Up A is to fit in with existing regulations, the long-term strategy is to "migrate that [the P2P platform] towards more of an energy market that we see. A more democratic form of resilient sustainable and renewable energy". He compares this strategic approach to Christensen's disruptive innovation theory:

"They [the other blockchain-in-energy start-ups] are trying to boil the ocean so to speak, while they are creating a whole market solution. Where we are taking the Clayton Christensen approach to disruptive innovation, which is bottom-up: solve a few small problems and keep the low-hanging fruits and then grow the company from there."
(BDL, Start-Up A)

This comparison illustrates the firm's evolving approach to strategy. At the beginning it is solving a few small problems of the energy market in collaboration with their partners. Eventually, they aim to offer a more holistic solution. The CEO of Start-Up A noted their solution is effectively "cutting out the middle-man to save consumers, and to maximise the returns for producers", but at the same time, his start-up does not aim to undermine the value proposition of energy retailers. Instead, they chose to partner up with these companies to enhance their product offering.

The company is currently involved in several coopetitive partnerships. To maintain a systematic analytical approach, I decide to focus on one collaboration in a deregulated

market and one in a regulated market. In the deregulated Japanese market, Start-Up A collaborates with the biggest Japanese energy retailer (Incumbent A1). In the highly regulated Southeast Asian market, the firm joins forces with a centralized state-owned utility company (Incumbent A2). Interestingly, in both environments, the start-up chooses to fully co-operate with the incumbent companies and to follow a "Software-as-a-Service"-approach to commercializing their technology. Consequently, the Australian start-up becomes a software supplier, while the established company as a customer improves its existing products with the start-up's technology to provide a better solution to the end-customer.

The start-up pursues different motives with the collaborative commercialization strategy. First and foremost, the Co-Founder and Managing Director emphasizes the accelerated growth as one rationale: "we needed to grow the company to millions to have the reach that we want to have". He adds that publicity and credibility is an equally important motive: "the fact that [Incumbent A1] is exploring [Start-Up A's] platform as a solution is a massive indication that the industry has accepted that change is inevitable". The BDL of Start-Up A further says that the incumbent's knowledge of "where the market is moving" and the learnings from the collaborative technology testing are very valuable for the next development steps of his start-up. Lastly, through the collaboration the start-up can increase its focus on developing the technology, while the incumbent takes over routine tasks such as regulatory approvals.

"While it is still fairly early days for this technology, we are keen to explore the potential benefits that P2P energy trading could offer our customers. [Start-Up A] is one of a number of emerging technologies we are currently exploring, which we believe could help us meet the changing needs of our customers." (Executive General Manager, Incumbent A1)

This statement of Incumbent A1's Executive General Manager emphasizes that the exploration of the new technology is the predominant motivation behind the collaboration with the start-up. Furthermore, the established energy retailer seeks to build innovation capability and technological know-how through this collaboration to eventually differentiate in an increasingly fierce competition in the energy industry. For instance, the president of Incumbent A1 outlines that Start-Up A's "P2P platform will optimize the offering for all of the participants".

Currently, the start-up is deploying its first commercialization projects, but throughout the way the BDL experienced that he "generally found that those organizations [incumbent energy retailers] are slow to move in regard to innovation". He metaphorically explains the collaborative innovation diffusion process:

"I do not know if you know about moving an object over a surface with a lot of friction. To move the object, you need to overcome the static friction, and then the object is rolling and that requires much less force. And I would say having this initial discussion that's the force to overcome friction. And then the deploying of the technology […] is the rolling of the object." (BDL, Start-Up A)

With this metaphor, he refers to the increased adoption after the collaboration with the incumbent company is started. The partnership enables the start-up to overcome the obstacles to commercialize the disruptive technology. Regarding the disruption of the energy industry through blockchain, the Co-Founder and Managing Director of Start-Up A confirms that "the industry needs to be disrupted in a managed a progressive way, rather than in a completely dysfunctional way", emphasizing the importance of electric power supply for households and organizations.

4.1.2 Start-Up E

Start-Up E, as the second case company, was founded in 2017, is based in Estonia, and raised approximately USD 40 million through its initial coin offering in 2018. Since its inception, the start-up has grown to more than 25 employees and has mainly been focussed on the Baltic, Nordic and Australian energy markets. Initially, the enterprise aimed to introduce a blockchain-based renewable energy procurement, investment and trading platform to empower individual consumers to take control over their energy purchasing decisions. Today, Start-Up E's solution is narrower, focussing on P2P energy trading among commercial customers in the form of power purchase agreements. In simple terms, a power purchase agreement is a contract between energy producer and consumer. As a deeper understanding of these agreements is not necessary for this study, I refrain from defining these in more detail.

Operating primarily in deregulated energy markets, Start-Up E faces similar challenges as Start-Up A explained for these environments. The Chief Marketing Officer (= CMO) of Start-Up E states that "the regulations are rather different across the markets, but it is not something that we cannot work with". In this context, he further highlights the

complexity of energy markets, which further increases in the case of internationalized operations. However, he emphasizes that the regulations are not the biggest challenge for Start-Up E, because it follows a very agile approach in its go-to-market approach, so that the software solution can be easily adapted to different regulations. In contrast, the firm's Co-Founder and CEO views access to infrastructure as a highly significant challenge, depicting that "infrastructure is very hard thing to get. You can have a very good idea, but then you do not have the infrastructure to try it out". Here, he alludes to the hard- and software, which is required to trial his company's applications, but owned by incumbent firms.

The impact of these challenges can be observed in Start-Up E's strategy. As contemplated before, the firm originally aimed to develop a holistic blockchain-based solution for the energy industry. This comprehensive solution intended to support energy procurement, investment and trading, while it targeted both consumers and commercial customers. According to the start-up's first whitepaper, the initial strategy was to obtain the required licenses on its own to set up an energy retailer and deploy the platform by themselves. Hence, the goal was to enter the market with a complete solution for the energy market.

While the CMO underscores that this still remains that ultimate vision, Start-Up E now pursues a divergent go-to-market approach. Instead of becoming a full-service provider straight away, which onboards both producers and consumers, the firm decided to "be mainly a technology provider" at the current stage. This means that Start-Up E now supplies its technology to established players in the energy industry such as energy retailers or energy consultants. The CMO justifies this strategy alteration with faster adoption of their solution if his start-up enters as a technology provider. He states that "if we are entering the market as a technology provider, we tend to develop partners quite naturally, because the same kind of partners would be our distribution channels and our clients". This statement elucidates the effect that if the start-up enters the market by themselves offering the solution to consumers, they compete with the incumbent companies. Start-Up E chooses not to compete with these players and instead enters the market as a technology provider, so that these players become the start-up's customers.

However, the Chief Information Officer (= CIO) metaphorically illustrates the decision to become a software supplier with "we do not want to eat the whole cake at once", underlining the gradual expansion of his firm's software application. The CMO adds that

“it is not like we are moving away [from becoming a full-service provider], but we have postponed our start as a full-service provider to start getting adoption as a technology provider for the companies that already do this kind of deals [energy retailers and energy consultants]”. Here, the interviewees explain that after the time-to-market was reduced because of the market entry as technology provider, their firm aims to become full-service provider in the long term. As full-service provider, the start-up offers its platform directly to end-customers without a partner, empowering consumers to trade energy among each other without an intermediary. In fact, the firm states in its whitepaper that it “will continue the journey to achieve the goal of becoming a next-generation virtual utility enabling the transition to sustainable energy from corporate renewable power purchase agreements”. Consequently, the supplier-customer relationship will shift towards a competitive relationship in the future.

Because of the chosen short-term strategy, Start-Up E publicly announced multiple partnerships. For instance, they collaborate with a state-owned grid operator in Estonia, a Baltic electricity retailer as well as a leading electricity retailer in Australia. In line with the scope of my study, I choose to analyse the partnership with the Baltic electricity retailer (Incumbent E) in more detail, as this is the most mature collaboration the start-up is involved in. Through the collaborations, the start-up aims to reduces its time to market as well as to install the credibility of its blockchain-based solution. Furthermore, Start-Up E emphasizes that the exchange of market knowledge with incumbent companies is crucial for its technology development as well as commercialization. A Board Member of Incumbent E explicates that, besides exploring the possibilities of the emerging blockchain-technology, his company aims to differentiate its offering from the competition: “we aim to use digital technologies to help customers make better everyday energy decisions”. Additionally, he emphasizes that his firm seeks to profit from the innovativeness of Start-Up E as well as to automatize internal processes with the new technology.

In regard to the general structure of the collaboration, the CMO explicates that “it highly depends on the internal structure of the company. Whether the company has some particular and specific innovation department, which task is to hunt down on start-ups and […] to come up with projects together with start-ups”. He further explains that the central point of contact for the start-up is the leader of the innovation department of the

incumbent. Concerning the practicalities of the partnership, the CMO explains that his start-up contributes to the partnership with its "unique approach to the technology". Here, he refers to the general platform functionalities as well as the energy tokenization technology by itself. He further adds that the general market approach of the start-up is very valuable in the collaboration, as Start-Up E "is quite fortunate to have many people from different backgrounds". In contrast, Incumbent E provides "tremendous insights into how our (Start-Up E's) tech could be relevant for them" (CMO, Start-Up E). Additionally, the incumbent elucidates its processes, needs and market insights for the start-up. Here, I observe that the contributed resources mirror the depicted customer-supplier relationship: while Start-Up E as a supplier provides the actual technology, Incumbent E as a customer solely offers insight into its needs and the market in general. Currently, the start-up is deploying large-scale trials of its technology with the incumbent partners, so that the commercialization can be begun in the next stage.

In regard to the innovation diffusion, Incumbent E's Head of Innovation explains that "[Start-Up E] is disruptive. It makes renewable energy more affordable and accessible by using blockchain technology", highlighting the high potential of the software solution. The CMO of Start-Up E further elucidates that "the partnerships influence our direction mostly within the frames of that particular partnership. It is not necessary that the core product has to be changed everywhere". Here, my observation that both firms collaborate similar to a traditional customer-supplier relationship is substantiated, because of the commoditization of the software sold by the start-up.

4.1.3 Start-Up S

Founded in 2017, the Singapore-based Start-Up S develops a blockchain-based P2P energy trading marketplace, leveraging blockchain and internet of things to transact large volumes of energy. Since its foundation, the start-up has grown to a team of more than 20 employees and recently raised approximately USD 30 million in its initial coin offering, selling utility tokens which can be used to pay transaction fees on the firm's platform in the future.

Similar to Start-Up A, Start-Up S is operating primarily in Southeast Asia as well as Japan and thus faces challenges in both regulated and deregulated energy markets. In general, the Strategy Leader (= SL) of Start-Up S explicated, that "the regulations have not evolved to the stage where they could especially prohibit something". Here, he refers to

the uncertainty around P2P energy trading as a liability of the concept novelty. He further compares his start-up's approach with those of others in the different area:

"A lot of these innovations [P2P energy trading applications] have been happening out of the U.S. and Europe, and of course you have [Start-Up A] in Australia, but a lot of them came from markets that were very, very different – really liberalised. What we wanted to do was to develop a model that could actually work [in a regulated market]" (SL, Start-Up S)

With this statement, the SL emphasizes his start-up's focus on the highly regulated Southeast Asian energy market. He continues "in the Southeast Asian region, in general I would say that the utilities are backward but very forward-looking". This commercial environment fundamentally shapes the strategic approach of the firm, because a very novel product encounters a very traditional market. Thus, the start-up has decided to enter the market in cooperation with a leading utility company as a partner. The SL justifies this approach explaining that it "is very difficult for a small start-up to come in and navigate this environment, because […] retailers do not really exist in these industries". As the concept of energy retailers has yet to be defined by regulators for these industries, the start-up cannot enter the market without a partner. On the other side, centralized utility companies are "looking for innovation they can deploy within their frameworks, where the utility is still the central player" (SL, Start-Up S). Hence, the SL believes that today these centralized utilities are the best party to run the energy trading platform.

"60% of world's population lives in Asia and almost half of this population live in cities; and they are all connected to central power grids. Japan liberalised its power grid in 2016, China has done so in parts and Singapore will be the first in Southeast-Asia. As more countries liberalise their electricity markets, consumers will get greater choice in choosing their electricity retailers and the way they want to consume energy" (Whitepaper, Start-Up S)

In the long-term, Start-Up S pursues a deviating strategy and I observed that the gradual liberalisation of the Southeast Asian energy industry is one key reason for this. As these markets become more accessible, the regulatory framework for energy retailers evolves and as a consequence, the start-up is allowed to enter the market without a partner. This enables Start-Up S to pursue its final vision, which is "a very utility-like position". The eventual goal is that Start-Up S "either runs the platform out of the local company or

through some special purpose vehicle with the utility partners". The SL emphasizes that how they reach this ultimate vision is a "journey-thing", but eventually his firm wants to open the P2P energy trading platform to "as many participants as possible to perform this matching function almost unbiasedly".

Currently, the Start-Up is involved in a partnership with a large utility company (Incumbent S), which permits the testing of its solution. Besides the access to infrastructure and the regulatory compliance, the SL elucidates that an important rationale behind this partnership is the exploitation of "economies of scale" of the incumbent by leveraging its existing customer base. The interviewee explains that exchanging knowledge about "cultural, regulatory and operational practices in foreign markets" with the incumbent also plays a role. Lastly, he underlines that increased market power as well as learning from cooperative trials benefit the development of Start-Up S. For the incumbent's motivation, he claims that its "interest in the application of the new technology […] which will have huge ramifications across global deregulated energy markets" is the key factor for initiating the partnership. The president of Incumbent S confirms that "amid a changing, more deregulated landscape, we look forward to bringing joint innovation to the market and making a positive difference in communities". Incumbent S further seeks to increase its operational efficiency through the application.

In regard to this collaboration, the SL exemplifies that at the current stage "everybody in [Start-Up S] is working on it". He continues that from the incumbent's side "it is their innovation-team within one of their subsidiaries". Like in Start-Up E's strategy, Start-Up S contributes with its unique combination of knowledge, which comprises energy industry, information technology as well as management experts. The incumbent has a large customer base, which is leveraged for the collaboratively testing and commercializing the technology. Furthermore, the partnership allows Start-Up S "to tap into the operational teams of Incumbent S to understand how they are doing things". Incumbent S aims to gain access to the extraordinary skills and knowledge base of the start-up. The SL of Start-Up S explains that Incumbent S has two alternative ways to gain access to this. First, they have the possibility to outsource the development to a software company. However, standard IT developers struggle with building a software which is tailored to the needs of the incumbent. Second, the incumbent could build an internal team to develop the software. Here, according to the SL of Start-Up S, it is very difficult for utility companies to group the different sources which are needed for the development

of blockchain-based P2P energy trading platforms. As Start-Up S combines knowledge about the energy industry with software know-how, Incumbent S seeks to profit from this combination.

As the key goal for the start-up is to learn about processes of the incumbent, the SL explains that his software development team is "very flexible to follow their [Incumbent S's] requirements. He further adds that "it is a very big milestone to deploy successfully within [Incumbent S's] customer base. I think it is very critical because they are the biggest partner that we have". This highlights the importance of the collaboration in the current phase. I find that the partnership, in this case, is highly cooperative up to this point, the testing of the technology, while in the long-term the strategy of Start-Up S appears to become more competitive.

4.1.4 Start-Up U

The last case company, Start-Up U is based in the United States and develops a variety of applications for the energy industry such as API, smart meter and blockchain. Although it was founded in 2012, I decide to include it in this study, because it represents the pioneer in this field and shifted its focus to blockchain-based P2P energy trading not before 2015. Most notably, Start-Up U as the first company successfully piloted such an application and consequently enabled the first P2P energy transaction in 2016. The start-up is financially backed by strategic partners such as energy companies and venture capital firms, while it has grown to a team of more than 20 employees.

The core markets of the start-up are Northern America and Europe. The energy markets in both regions are largely deregulated, although in some parts of the U.S. they have yet to open up for competition among energy retailers. For both environments, regulated and deregulated, the BDL of Start-Up U emphasizes that "regulators are not set up for P2P transactive energy business models", which represents a significant challenge for his start-up to enter the market. He further elaborates on the key distinction between regulated and deregulated environments. For a highly regulated market in the U.S., he exemplifies that "utilities earn a regulated rate of return based on the capital they invest to expand, operate and maintain their capacity to distribute and in many cases to generate electrical energy". Hence, if start-ups enter this market on their own, they would only achieve a financial return based on the capital they invest into infrastructure. As none of the case companies intends to invest heavily in infrastructure, the non-partnership entry strategy

is not financially viable under these circumstances. Interestingly, Start-Up U is involved in discussions with the governmental institutions to explore concepts for the future of the energy industry. In this context, the interviewee elucidates that "we certainly do want to influence that [the regulations] to the extent we can. However, we are a small company with limited resources". Nevertheless, he hints that "the future is going to be way more competitive in the energy industry", as governments increasingly liberalise energy markets.

"For us as a start-up, we need to have a near-term business model and I can describe to you what the ultimate vision is, but realistically, we need to stay alive as long as we get there. Where is the commercial value for a company like us today and where is it leading to? The regulatory aspect is definitely the biggest challenge at the moment."
(BDL, Start-Up U)

This quote points out the impact of the commercial environment on the strategy of the start-up. As the regulations have yet to evolve to the stage where the case company can directly pursue its vision, it needs to create value for customers immediately to generate financial returns. As a result, Start-Up U follows the "Software-as-a-Service" model in the short-term, offering a blockchain-based software solution to incumbent energy retailers, allowing these companies to improve their existing offering. Hence, Start-Up U chooses not to become an energy retailer themselves. The BDL justifies this decision: "being an energy retailer is not an attractive model […]: Energy retailers are in the fight for the cheapest electricity right now, so the margins are very thin, and it is tough to differentiate". This implies that with this strategy the start-up avoids entering a mature and highly competitive market and instead focusses on collaborating with established companies in this market, which are exposed to increasingly fierce competition and thus seek to differentiate their offering.

However, the BDL expects that the "commercial value of [Start-Up U] will change as regulation changes", alluding to his start-up's long-term strategy and vision. As he anticipates that the commercial environment becomes increasingly favourable for innovative P2P energy trading solutions, Start-Up U aims to gradually expand its software solution. Features such as distributed energy and occasional pricing are progressively added to the software, allowing the firm eventually to offer a "Utility-as-a-Platform" concept. With this solution, the case company aspires to transform the value proposition

of incumbent energy retailers into a platform to empower individual consumers to expand the control of their electricity purchasing decisions. This concept has major implications for the relationship with its partners. Start-Up U is deploying its platform collaboratively with the incumbent company. While the start-up provides the technical solution, the incumbent can utilize the platform to sell its energy and to offer its customers more options.

In accordance with its short-term strategy, Start-Up U is involved in several partnerships with incumbent companies in the energy industry. For my research, I focus on the most extensive and mature partnership of the firm with a leading British electricity retailer (Incumbent U). So far, the partners have collaboratively conducted pilots of the P2P energy trading platform and are currently in the phase of launching a large-scale trial in Southwest England. The interviewee of Start-Up U conveys multiple motivations for entering the partnership. Most importantly, his firm has the possibility of extensive publicity by collaborating with a leading energy retailers, explaining that the partnership is of "large national and international interest". A second rationale for the start-up is the acceleration of its growth:

"We think that as a company we want to grow fast and probably in multiple markets. So, we think that we need partnerships, because otherwise we could not do that in multiple markets at the same time." (BDL, Start-Up U)

The BDL further hints that his firm requires a "retail license to sell electricity" as well as access to the electricity grid to transact electricity – two resources the incumbent possesses ownership of. Through the partnership with this party, the start-up can access these resources. Furthermore, the case company seeks to profit from Incumbent U's knowledge "of the local markets and their customer base" (BDL). Lastly, the interviewee highlights that the learnings made in the cooperative trials enable the continuous improvement of the software. Due to the inhomogeneity of the partners, the incumbent has other rationales for initiating the collaboration:

"The question we want to answer through this pilot is whether blockchain can deliver significant value to the system as a whole. We don't know, being brutally honest, if blockchain can deliver value" (Program Director, Incumbent U)

This statement indicates the main motivation of Incumbent U: exploring an emerging and potentially disruptive technology. Besides this, the CEO of Incumbent U argues that the partnership is "allowing us to find new and better ways to delivering energy to our customers", alluding to differentiating his firm's offering in a highly competitive environment. In this context, the BDL of Start-Up U explicates that the incumbents "have a really big interest of moving more into a service-based business model". Hence, these established players are "trying to figure out what a platform business model would look like for them" (BDL, Start-Up U). These statements emphasize that the start-up envisions to deploy the "Utility-as-a-Service" platform collaboratively rather than competing with the incumbent firm.

In regard to the partnership itself, the BDL claims that "existing models have to change" and that "companies that are interested in cannibalizing themselves tend to be the partners [Start-Up U] works best with". In fact, he admits that the concept of P2P energy trading is not profitable with the energy retailers' current business model. He illustrates that the start-up's partner needs to face "a short-term pain to get a long-term gain". For the structure of the partnership, the interviewee explains that "the way that the relationships are structured is that we have an additional pilot that is sort of the kick-off". He further elaborates on the structure:

> "The average partnership is between us and a competitive retailer or a vertically integrated utility if we are working in certain markets in the U.S., but most of the markets we are working in are competitive." (BDL, Start-Up U)

During the relationships with incumbent companies, the BDL deems open communication and knowledge sharing very important, exemplifying that his team "thought about whether we want to incorporate billing into our platform. In working with our partners, we found out that billing is actually their only touchpoint with their customers and so we would be disintermediation the relationship with their customers". As software development teams go through "multiple iterations as the technology improves" (BDL, Start-Up U), the feedback from the established firm is crucial. In addition, he argues that knowledge protection does not play a key role in the collaboration with Incumbent U: "Think about how fast blockchain is changing and how much infrastructure investments there is, we likely will be transitioning to new blockchains in the future". Lastly, the BDL describes that an aligned vision of both partners builds the

basis for the collaboration, so that both the start-up and incumbent move into the same direction.

The interviewee confirms that “the collaboration is critical, because it is our path to market. So, if the relationship does not work, the business model will not work”. The CEO and Co-Founder of Start-Up U underscore that “this is not a revolution or a disruption. It is an evolution”.

4.2 Cross-Case Analysis and Discussion

In this section, I continue with the second and third step of my analytical approach. By conducting a cross-case analysis, I identify the similarities as well as differences across the four presented cases and enfold the respective literature to discuss the emerging patterns. Coherent with my theoretical framework, I structure this part into four themes: commercial environment, motivations, the process of coopetition and innovation diffusion. Even though the case companies develop a comparable product, they have dissimilar backgrounds and pursue deviating strategies (see Table 4).

	Start-Up A	**Start-Up E**	**Start-Up S**	**Start-Up U**
HQ	Australia	Estonia	Singapore	United States
Year	2016	2017	2017	2012
Team	30+	25+	20+	20+
Funding	USD 24 million	USD 40 million	USD 30 million	Not disclosed
Stage	Commercialization	Large-scale trial	Small-scale pilot	Large-scale trial
Environments	Australia, Japan (deregulated) U.S. (partially regulated) Southeast Asia (regulated)	Australia, Baltics, Nordics (deregulated)	Japan (deregulated) Southeast Asia (regulated)	Central/Western Europe (deregulated) U.S. (partially regulated)
Short-term strategy	Software-as-a-Service model for energy retailers	Technology-provider for incumbent energy retailers	Software-providers for incumbent energy retailers	Consulting firm providing Software-as-a-Service for energy retailers
Long-term strategy	Expansion of software to more holistic solution for future energy market	Full-service provider with platform for producer and consumer	Utility-like role with platform solution for producer and consumer	Utility-as-a-Platform solution deployed with incumbent
Partnerships	Leading utility company in Japan and in Singapore	Energy retailer in Baltics, leading energy retailer in Australia	Leading utility company in Japan and in Singapore	Leading energy retailer in U.K. (among others)

Table 4: Overview about Case Companies, Source: own creation

As Table 4 illustrates, key differences exist among the case companies. Firstly, the four start-ups are based in very diverse geographical locations, and consequently operate in different markets and environments. As the environment can be categorized in regulated and deregulated, I believe that its impact on the start-ups' strategy can be elucidated. Secondly, the four firms are in different stages of its go-to-market approach. While Start-Up A is already commercializing its technology, the other start-ups have yet to reach this stage. Start-Up E and Start-Up U are currently finalizing large-scale trials to proceed with the commercialization soon. The different stages allow the analysis of motivations throughout the go-to-market path. Lastly, I identified that while all case companies follow a two-phase strategic approach, the strategies in each phase a dissimilar with implications on the coopetitive partnerships. In the next sections, I comprehensively analyse and discuss my empirical findings to eventually modify the theoretical framework, so that the research questions can be answered.

4.2.1 Commercial Environment

This chapter analyses and discusses my findings of the impact of the commercial environment on the case companies' strategies and coopetitive partnerships. As presented for each case separately in the preceding chapter, all four case companies highlight the significance of the commercial environment for their strategy. I find that the commercial environment in the energy industry is characterized by two key factors: regulatory and infrastructural environment. Although these two areas are partially interconnected, I first describe each factor individually, before I illustrate conjunctive elements and its impact.

Regulatory Environment

I find that the four case companies concordantly agree that the regulatory environment in the energy industry represents a major challenge. Even though the start-ups' product, blockchain-based P2P energy trading, is not explicitly prohibited by any regulations, they are forced to cope with the liability. This applies to both regulated (i.e. Southeast Asia) and deregulated energy markets (i.e. Australia or Central/Western Europe). In according to the explanations of the case companies, the interviewed industry expert illustrates the importance of rules by comparing the energy industry with the healthcare industry:

> "As we think about disruption and as we think about the two industries of healthcare and energy, there are different reasons, why they are behind on digitization and information technology. In one case it is a massive physical infrastructure that works

when it is stupid. That is electricity and energy flows. In the other, it is an incredibly complex domain, where digitization runs into enormous complexity of the human body and medical treatments." (Michael Barnard, Industry Expert)

Here, he alludes to the importance of reliable power supply for households and industries, and that regulations aim to ensure this uninterrupted supply. In the context of the other interviewee's accounts, Barnard's explanations confirm that these regulations represent a major market entry barrier for the start-ups, as the impact of their solutions on the reliability of the energy system have yet to be explored.

In addition to the challenge represented by non-existing regulations, I find that also existing regulations impede the market entry of disruptive start-ups. In this context, it is important to differentiate based on the level of regulation into regulated and deregulated markets. For regulated markets, the interviewees of Start-Up A and Start-Up U depict that regulations render the financial and legal viability of the start-ups' business model impossible. Most noticeably, the three start-ups which have operations in regulated environments outlined that competitive retailers do not exist in these regulatory frameworks, as their value proposition is executed by state-owned utility companies. Hence, these regulations preclude innovative start-ups entirely from disrupting the industry, since they cannot enter the market without partnering with the incumbent state-owned utility company.

In regulated environments, energy retailers exist, and fierce competition exists among them. However, even in these markets, I discovered that start-ups face significant regulatory challenges to enter the market. First and foremost, all interviewees explained that energy retail licenses are required for the deployment of P2P energy trading concepts on the electricity grid. Interestingly, different strategies to comply with this legal requirement were exemplified. Start-Up A and Start-Up U partner with incumbent companies which own such a license, and thus adjust their go-to-market approach due to this legal requirement. Start-Up S follows the same approach but emphasizes that for the internationalization it is planned to increasingly acquire retail licenses without a partner. Start-Up E explains that its partners usually own these licenses, but in the future, it also plans to acquire these on their own. While the case companies follow slightly deviating approaches in obtaining the license, they concur that the existing regulations complicate their commercialization strategy.

While all start-ups accept the existing regulations with their business models, two of the start-ups (Start-Up A and Start-Up U) proactively engage in discussion with regulators. Although both firms admit that regulatory change is very difficult to achieve as a start-up, I observed that through the conversations the regulators are becoming increasingly aware of the innovative P2P energy trading platforms. For instance, the Managing Director and Co-Founder of Start-Up A explains that "governments and regulators around the world are taking a closer and more detailed view, but not from the perspective of shutting it down".

Infrastructural Environment

Despite the regulatory environment presumably has the most significant impact on start-ups operating in the energy industry, the infrastructural environment also plays a crucial role. The four case companies have highlighted that the exclusivity of certain resources in the energy industry represents a major challenge. More specifically, they emphasized the need for access to two infrastructural components to test and deploy the P2P energy trading platforms: the electricity grid and the smart meters. While the electricity grid is usually owned by the state-owned utility company or by distribution/transmission system operators, the energy consumption data of smart meters is usually owned by the state-owned utility company or incumbent energy retailers. No matter which party the owner is, the start-ups require access to it to develop, pilot and eventually deploy their solution. However, a clear link between regulatory and infrastructural environment is evident. On the one hand, the ownership of the infrastructural resources is determined by governmental policies. On the other hand, changes in the infrastructures, for instance through the advent of wind and solar farms, require changes in the regulatory landscape. I observe that the former connection is significant for the case companies. The current ownership of the infrastructure is a major reason for all four case companies to cooperate with incumbent energy retailers, as they already possess the access or the ownership to the necessary components.

Impact of Commercial Environment

The reason why I dedicate a whole subchapter to the commercial environment is its significant impact on the start-ups strategy and thus on the coopetitive partnerships. As Figure 15 visualizes, I find that in the short-term all start-ups aim to fit in with the existing regulatory and infrastructural environment to be able to create immediate value for

customers. However, as the start-ups anticipate that the commercial environment and thus its value will change in the future, they pursue a deviating strategy in the long-term. Hence, I identified that all start-ups follow a two-phase strategy.

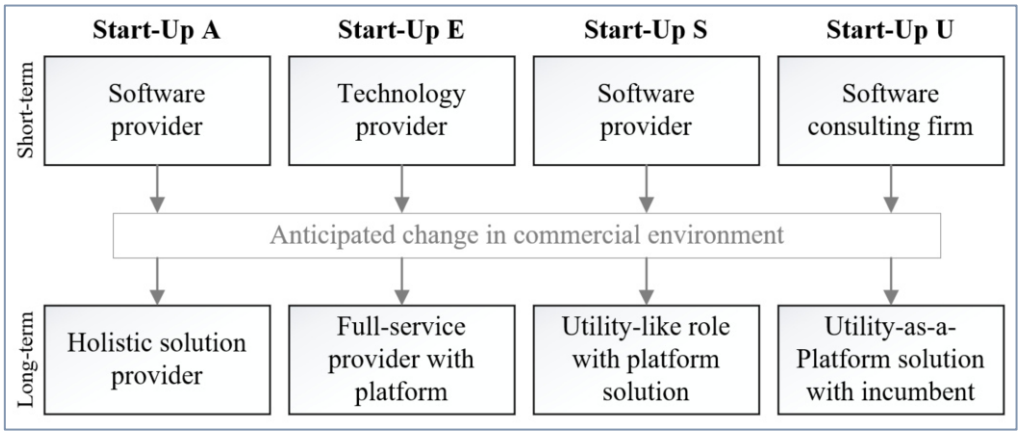

Figure 15: Impact of Commercial Environment on Start-Ups' Strategies, Source: own creation

Each strategy consists of a short-term commercialization-strategy and a long-term expansion-strategy. I find that the key factor for the distinction is the commercial environment. The interviewee of Start-Up A illustrates this with the following quote:

> "Innovation is outpacing regulation - what is new and innovative is either fitting in or trying to fit into existing regulation. Or you need regulatory change and getting regulatory change is very difficult". (BDL, Start-Up A)

All four start-ups aim to fit into existing regulations. They achieve this by entering the market with a B2B-model, offering their technology or software-solution to incumbent energy retailers to comply with existing regulations. However, I discover for the second phase that the start-ups gradually adjust their strategy towards more independence from the incumbent. While two of the Start-Ups (Start-Up A and Start-Up U) emphasize that their vision for the long-term involves collaborating with incumbent energy retailers, the other two start-ups have a deviating vision. Start-Up E plans to become a full-service provider with a platform solution, which directly connects producers and consumers. As a result of this model, the value proposition of the incumbent energy retailers would be rendered obsolete. Start-Up S aims to proceed with a hybrid-model in the second phase, entering certain markets as an energy retailer themselves and partnering with incumbent energy retailers in other markets.

Based on the described similarities and differences among the cases, I identify several cross-case patterns. First, the uncertain commercial environment represents a major

challenge for the start-ups because it is difficult to navigate when necessary regulations have yet to evolve. Enfolding previous literature, Bhide (2000) confirms this finding, claiming that regulatory and technological uncertainty has an aggravating impact on the profit potential of start-ups operating in a niche. He further indicates a link between the novelty of a start-up's product and the uncertainty of the environment. Other studies confirm this link by showing a negative correlation between innovativeness and start-up survival (Brown *et al.*, 2012; Hyytinen *et al.*, 2015; Markides, 2006). However, the research in this field is inconclusive as multiple studies have found evidence for a positive connection between these two factors (i.e. Helmers and Rogers, 2010; Wagner and Cockburn, 2010).

Second, I find the emerging pattern that the regulatory and infrastructural environment significantly influence the market entry of these start-ups. I observed that these two factors can force new entrants to collaborate with incumbent companies to commercialize their innovation. Christensen *et al.* (2004) underscore the impact of regulations on disruptive innovations. More specifically, they explain that governments can utilize levers to target the two factors motivation and ability to eventually promote innovation. In the case of the four start-ups, first and foremost competition policies hinder them from entering the market without a partner. However, the start-ups anticipate the intervention of governments, which will support their ability to diffuse their disruptive innovation. Graffy and Kihm (2014) further show that governmental policies can prevent incumbents from being disrupted, but are not to be seen as a permanent protection. Lastly, previous literature supports my finding that a reciprocal relationship exists between commercial environment and companies (Stenzel and Frenzel, 2008). While the start-ups adjust to the circumstances, some of them also engage in governmental discussion to eventually adjust the regulations. Besides the regulatory environment, previous literature also corroborates that infrastructure is another major factor impacting the commercialization strategy of disruptive start-ups (Gans and Stern, 2003; Teece, 1986). In line with my findings, the existing literature explains that assets, which are possessed by the incumbent and hard to duplicate for the new entrant, represent a significant market entry barrier.

Third, I discover that all of the four case companies follow a two-phase strategy. In the first phase, they choose to follow a partnership approach. In the second phase, they pursue a deviating strategy by progressively adapting to the changing commercial environment. Throughout the two phases, the interviewees emphasized the need for flexibility and

adaptability. Christensen and Raynor (2003) confirm this need especially for the early stages of the innovation commercialization. This necessity for flexibility is further increased for the case companies, since they choose to coopetitively diffuse their disruptive innovation with incumbent partners (Ansari *et al.*, 2016). Further studies have affirmed the need for an adjustable strategy to maintain coopetitive balance and to avoid tensions throughout the process of collaboration (Gnyawali and Charleton, 2018).

This chapter highlights the commercial environment, in particular regulatory compliance and access to infrastructure as two fundamental motivations for start-ups to enter partnerships with incumbent companies. However, I find a multitude of additional motivations from both the start-ups' as well as the incumbents' perspective, which I elucidate in the following part of my study.

4.2.2 Motivations for Coopetitive Partnerships

As the second theme of this study, I choose to analyse and discuss the reasons why start-ups and incumbents engage in coopetitive partnerships. The motivations of each party are particularly interesting because the relationship consists of cooperative as well as competitive elements. As outlined in Chapter 3.2, the selected start-ups seek to enter the energy industry with an innovation that negatively impacts the value proposition of the incumbents at the least or renders their business model obsolete at the worst. However, both parties decide to collaborate. In the next sections, I successively analyse the motivations of each party, before I synthesize in the end and discuss the emerging cross-case patterns.

Perspective of the Start-Up

Since the interviewees of the four case companies mention a multitude of reasons for engaging in partnerships with incumbent companies, I conduct a semi-quantitative analysis to create an overview about the frequency for each of the factors (see Figure 16). This frequency shows, based on my inductive coding, how often each start-up made mention of each rationale.

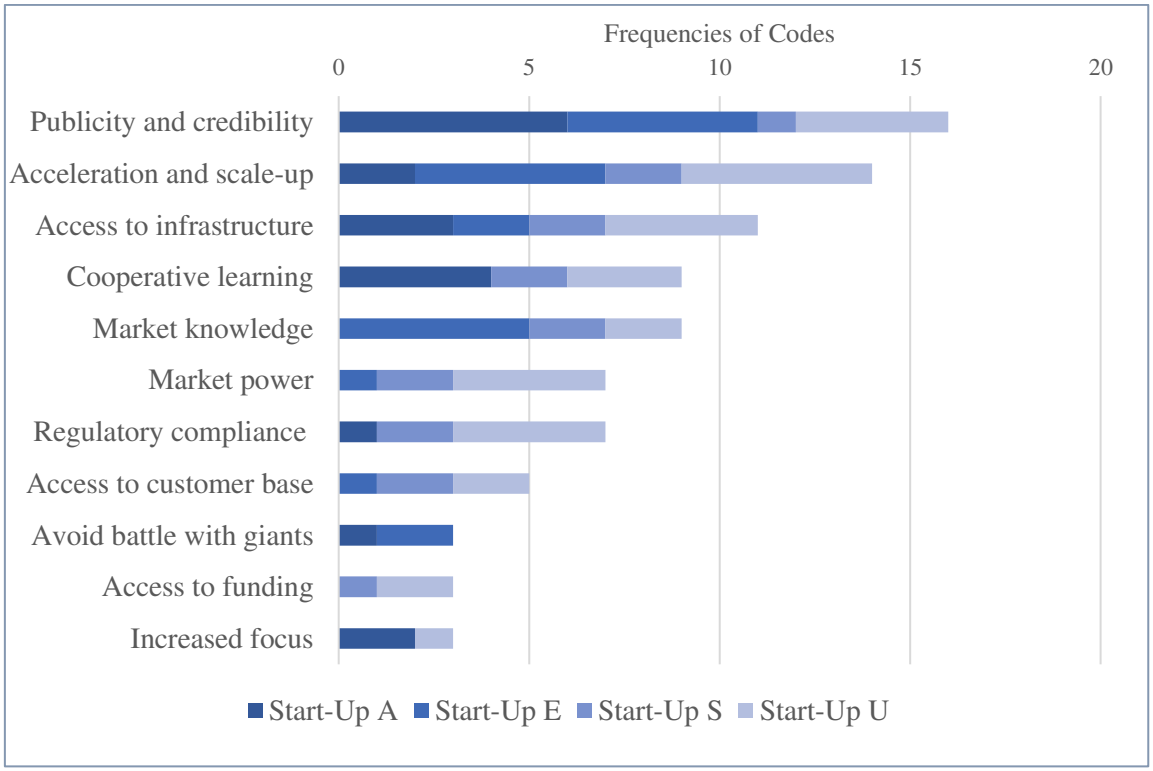

Figure 16: Motivation Factors of Start-Ups, Source: own creation

The semi-quantitative analysis visualizes the significance of the factors for each of the start-ups. By analysing the chart, it becomes clear that three of the eleven identified factors are relevant for all four start-ups: publicity and credibility, acceleration and scale-up and access to infrastructure. The next five factors are relevant for three of the four case companies, whereas the last three were only mentioned by two start-ups. In the following, I elaborate on the dominant factors to explain why start-ups engage in coopetitive partnerships.

According to the analysis, gaining **publicity and credibility** through the coopetitive partnership is one of the major motivations for the interviewed start-ups. This is coherent with the interviewees explanations. As the energy industry is traditionally very slow-moving, the interviewees aim to initiate discussions around innovative energy trading concepts to eventually achieve regulatory changes in their favour. Furthermore, I observe that the start-ups aspire to accomplish network effects for its platform by increasing its customer base through the gained publicity. In this context, I discover that also the blockchain-based business model plays a role. As the CIO of Start-Up E elucidates, at the beginning of the foundation of blockchain-based ventures "the focus is put on marketing and promoting the ICO itself". As introduced in Chapter 2.3, start-ups with a blockchain-

based product are enabled to sell 'coins' to finance its growth. Since three of the case companies have raised more than USD 20 million through the ICO, I conclude that marketing has indeed played a major role in the early stages of the venture. However, as these three case companies have passed the ICO-stage and still emphasize the importance of publicity through the coopetitive partnership, I argue that this factor is not specific to the circumstances of this study.

The second-most frequently mentioned rationale is **acceleration and scale-up**. As the four start-ups aspire to grow at a fast pace, they want to exploit economies of scale of the incumbent company. As aforementioned, by leveraging the coverage of the incumbent company, the start-ups seek to accelerate network effects, which again spur the growth of its platform. As the Managing Director of Start-Up A emphasizes, the case companies "needed to grow the company to millions to have the reach" they want to attain. Undoubtedly, accomplishing a growth to that dimension represents a major obstacle for start-ups with limited resources.

As comprehensively explained in the preceding chapter, **access to infrastructure** is crucial for the four case companies and consequently the third-most stated motivation factor mentioned by all case companies. Surprisingly, **regulatory compliance** was only mentioned by three of the four firms as a rationale for engaging in partnerships with incumbents. Start-Up E portrays the only company which omits to mention this motive. Clearly, this is not because this start-up deems regulatory compliance unimportant. Instead, they choose a diverging strategic approach. According to the firm's whitepaper, the start-up aims to acquire a retail license by themselves in the long-term, enabling them to operate on the electricity grid fully compliant without the necessity for a partner.

The next factors were mentioned by three of the four case companies. **Cooperative learning** describes the experience and knowledge the start-ups gain from the collaborative testing and deployment of the platform with incumbents. Again, Start-Up E is the only company not emphasizing this factor. A possible explanation is its current development stage. Although the firm already executed small-scale pilots in the past, the large-scale pilot is still in a nascent stage. For the next two motivation factors, **market knowledge** and **market power**, I argue that the opposite is the reason why Start-Up A has not indicated its importance. The interviewed expert emphasizes that Start-Up A received the most traction in comparison to the other three case companies. This is

confirmed by the fact that the firm is currently engaged in a governmental inquiry about the Australian electricity market, which reviews the current regulations. Furthermore, the enterprise was founded by former staff of leading electricity retailers, reducing the need for comprehensive additional market insights. Hence, I claim that this is the reason why the firm views the marginal benefit of the partnership in regard to these two factors, market knowledge and market power, as marginal.

The remaining four factors – **access to customer base**, **avoiding battles with giants**, **access to funding** and **increased focus** – are mentioned not more than five times by the case companies and thus I deem them insignificant as rationales behind the partnership. However, I take them into account in case the previous literature refutes this assertion.

Perspective of Incumbent Company

Since the incumbent's situation is fundamentally different than the start-up's, the established firm pursues divergent interests by engaging in coopetitive partnerships with disruptive start-ups. By coding the incumbents' motivations, six distinct factors emerged. As for the start-up's perspective, I conduct a semi-quantitative analysis to show the relative importance of each factor (see Figure 17). To ensure high validity and reliability of the findings, I systematically collected data on the most extensive and mature partnerships of each start-up.

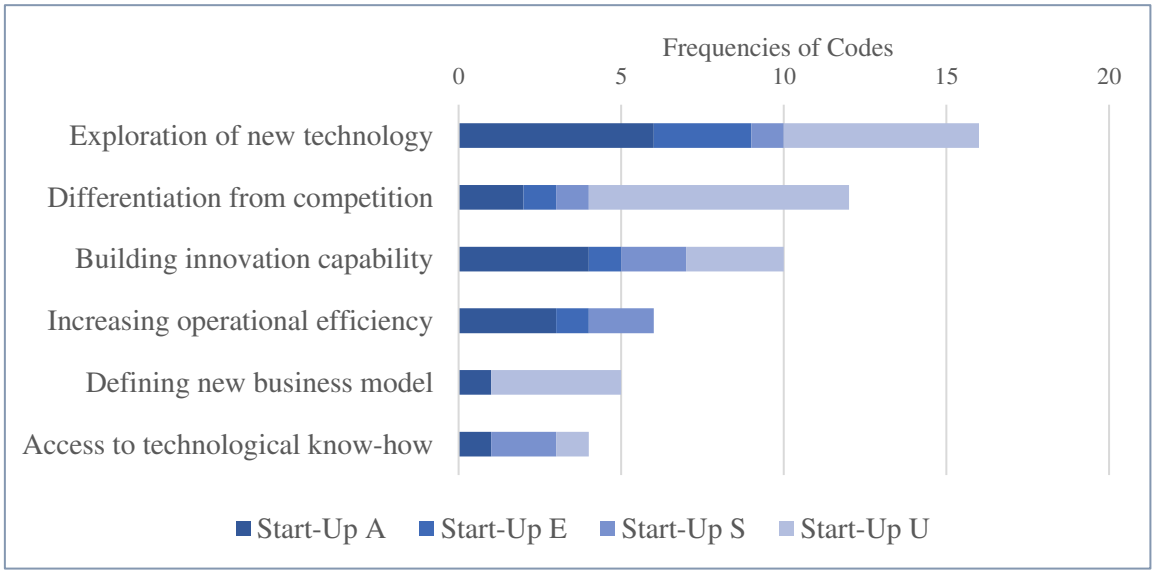

Figure 17: Motivation Factors of Incumbent, Source: own creation

According to the semi-quantitative analysis, three motivation factors are stated in all four cases. Moreover, two reasons are expressed by three and one reason is only expressed by

two of the cases. As the most dominant reason for incumbents engaging in coopetitive partnerships with disruptive start-ups, **exploration of new technology** emerged. As described in the literature review, blockchain-technology has received extensive publicity in recent months and hence the interest of corporates is sparked to explore the disruptive potential.

The second-most important reason for the incumbent's engagement in partnerships is **differentiation from competition**. I observe that this factor is predominantly highlighted by the partners of Start-Up A and Start-Up U. Based on the cross-case comparison, I believe that two possible explanations exist. First, as both of the other start-ups (Start-Up E and Start-Up S) have yet to reach the commercialization stage with their technology, the incumbent partners might not see the differentiation potential so far. Furthermore, as Start-Up S is operating in the Southeast Asian market, a regulated one without competition, the incumbent is not exposed to competition and is consequently not forced to differentiate their offering.

Building innovation capability is the third factor, which is important for all of the case companies. This factor specifically summarizes the motivation of incumbents to proactively adapt to a changing landscape in the energy industry. As the Southeast Asian market is a good showcase for a changing environment since it is currently in the process of opening up to competition, the following statement of Incumbent S's president summarizes the rationale behind this factor: "amid a changing, more deregulated landscape, we look forward to bringing joint innovation to the market and making a positive difference in communities".

As for the start-up's motives, I refrain from elaborating on the three least-frequently mentioned motivation factors **increasing operational efficiency**, **defining new business model** and **access to technological know-how** as they can be deemed less dominant. These three were mentioned not more than six times by the incumbent companies. However, if the previous literature indicates the importance of some of these factors, I discuss this divergence.

By analysing the motives of start-ups and incumbents across the four cases, three clear patterns emerge. First, the benefits linked to the motivation factors of the start-up are realized at dissimilar points of time. The two motives access to infrastructure and regulatory compliance deal with overcoming market entry barriers before and during the

commercialization of the innovation. The other dominant rationales – publicity and credibility, acceleration and scale-up, cooperative learning, market knowledge and market power – aim to increase the start-ups' competitiveness and hence the chance for the start-up to survive over time. Enfolding existing literature, I discover that publicity and acceleration of growth are largely confirmed as a motivation for start-ups engaging in partnerships with incumbent companies (Hora *et al.*, 2018; Lechner and Dowling, 2003). Furthermore, I find that previous research indicates cooperative learning and access to scarce resources as additional reasons for entrepreneurial firms entering coopetition (Dussauge *et al.*, 2000; Lechner and Dowling, 2003; Soppe *et al.*, 2014). More specifically, Soppe *et al.* (2014) state that "young firms can effectively overcome the lack of sufficient resources […]. We propose that this is especially the case in industries with highly scarce resources" (p. 560). This statement not only confirms my findings about the importance of "access to infrastructure", but also explicates the significant impact of the commercial environment on the go-to-market strategies of new entrants. The findings of Gans and Stern (2003) further substantiate access to infrastructure as a reason why start-ups enter partnerships with established firms.

Aware that literature about coopetition among start-ups and incumbents is very sparse, I decide to take also findings of motivations of coopetition among equally large corporations into account. Here, I find that particularly access to complementary assets and skills as well as sales growth are highlighted as motivation factors (i.e. Bengtsson and Kock, 2000; Brolos, 2009; Gnyawali and Park, 2009). Confirmed only by research on strategic alliances, increased market power is not yet described as a major factor by research on coopetitive partnerships (Rond and Bouchikhi, 2004). However, based on the systematic coding and the subsequent semi-quantitative analysis, I claim that increase of market power represents a dominant motivation factor for start-ups engaging in coopetitive partnerships with incumbents, since the partnership allows them to leverage the existing relationships of the larger counterpart.

Furthermore, previous literature does not suggest regulatory compliance as a major motivation factor by start-ups for coopetitive partnerships with incumbents. However, as all four case companies clearly define the regulatory uncertainty as a major challenge and hence regulatory compliance as a major rationale for coopetition, this contradiction with the literature is surprising. Based on this discovery, I argue that regulatory compliance is a major motivation factor in this particular commercial environment. In industries, where

policies impede the market entry, new entrants can overcome these barriers by collaborating with established companies. In this context, I refer to the limitations of the study (Chapter 5.3), as this finding is only generalizable for certain environments.

As the second cross-case pattern, I identify that most of the motives for the incumbents focus long-term benefits. For instance, while the technology itself can be explored in the short-term, the evolution of a widely scalable solution is likely to take five to ten more years according to the research institute Gartner (Panetta, 2018). Hence, the incumbents can only differentiate themselves from the competition with blockchain-based P2P energy trading platforms in the long-run. The rationale "building innovation capability" also aims to improve the incumbent's offering rather in the long-term. In their research about coopetition between start-ups and incumbents, Hora *et al.* (2018) confirm the importance of building innovation capabilities and accessing technological know-how, supporting two factors I identified. Moreover, coopetition as a reason for creating a competitive advantage has been widely proofed (i.e. Pereira and Leitao, 2016; Soriano, 2016; Rusko *et al.*, 2018). Furthermore, Ansari *et al.* (2016) suggest, based on their study of the disruption of the television ecosystem, that incumbents have an interest in exploring a disruptive technology, underlining the importance of this factor. As an underlying rationale for all the two factors "building innovation capability" and "differentiating from competition", access to complementary skills and knowledge can be identified, which is widely proved by previous research on coopetition (Bengtsson and Kock, 2000; Brolos, 2009; Gnyawali and Park, 2009).

Third, by comparing these two emergent patterns, I find a difference in the time frame of the realization of the motivation factor's underlying benefits. More specifically, a time-lag becomes evident between the realization of the benefits of the coopetition by the start-up and the incumbent. As introduced, the start-up profits from the coopetition immediately by overcoming market entry barriers as well as in the short-term by enhancing its competitiveness in a critical stage. In contrast, the incumbent profits predominantly in the long-term by improving its offering through the incorporation of the disruptive technology, once it reaches a sufficiently mature stage. This defined by one of the interviewees as self-cannibalization as these established firms face "a short-term pain to get a long-term gain" (BDL, Start-Up U). After reviewing additional literature in light of this finding, I conclude that this temporal divergence has been largely omitted by previous research. Only Ansari *et al.* (2016) find that intertemporal divergence, "the

potential for future benefits for ecosystem members along with perceptions of immediate disruption generated forces for both cooperation and competition between [start-ups] and incumbents" (p. 9), have a significant impact on coopetition. The next chapter will further explore this intertemporal divergence throughout the process of coopetition, aiming to further elucidate and substantiate this novel finding.

4.2.3 Process of Coopetition

Coopetitive partnerships represent a complex phenomenon, since they simultaneously comprise cooperative as well as competitive elements. Coopetition between start-ups and incumbents adds further complexity due to the inhomogeneity of the partners. To amplify the process of this partnership, I start this section by describing my findings of cooperative and competitive elements as well as its intensities. In this context, I also illustrate the shifting balance between both forces over time and elucidate the reasons for these balance shifts. Subsequently, I elaborate on my observations of tensions evolving from coopetitive partnerships. Lastly, as the management of these partnerships is highly complex due to the inherently paradoxical relationship, I conclude this section with elucidating critical success factors.

4.2.3.1 Coopetitive Balance

As products and business-models of the four start-ups are relatively homogeneous, I discover that the case companies uniformly go through three overarching phases: pre-commercialization, commercialization and expansion. I utilize these phases to structure my explanations about the balance shifts. Figure 18 visualizes the balance between cooperative and competitive forces over time for the three distinct phases. I amplify each of the phases and the decision points in the following sections. Furthermore, to increase the traceability of these empirical findings, Appendix 7 provides an overview of cooperative and competitive elements in the different phases.

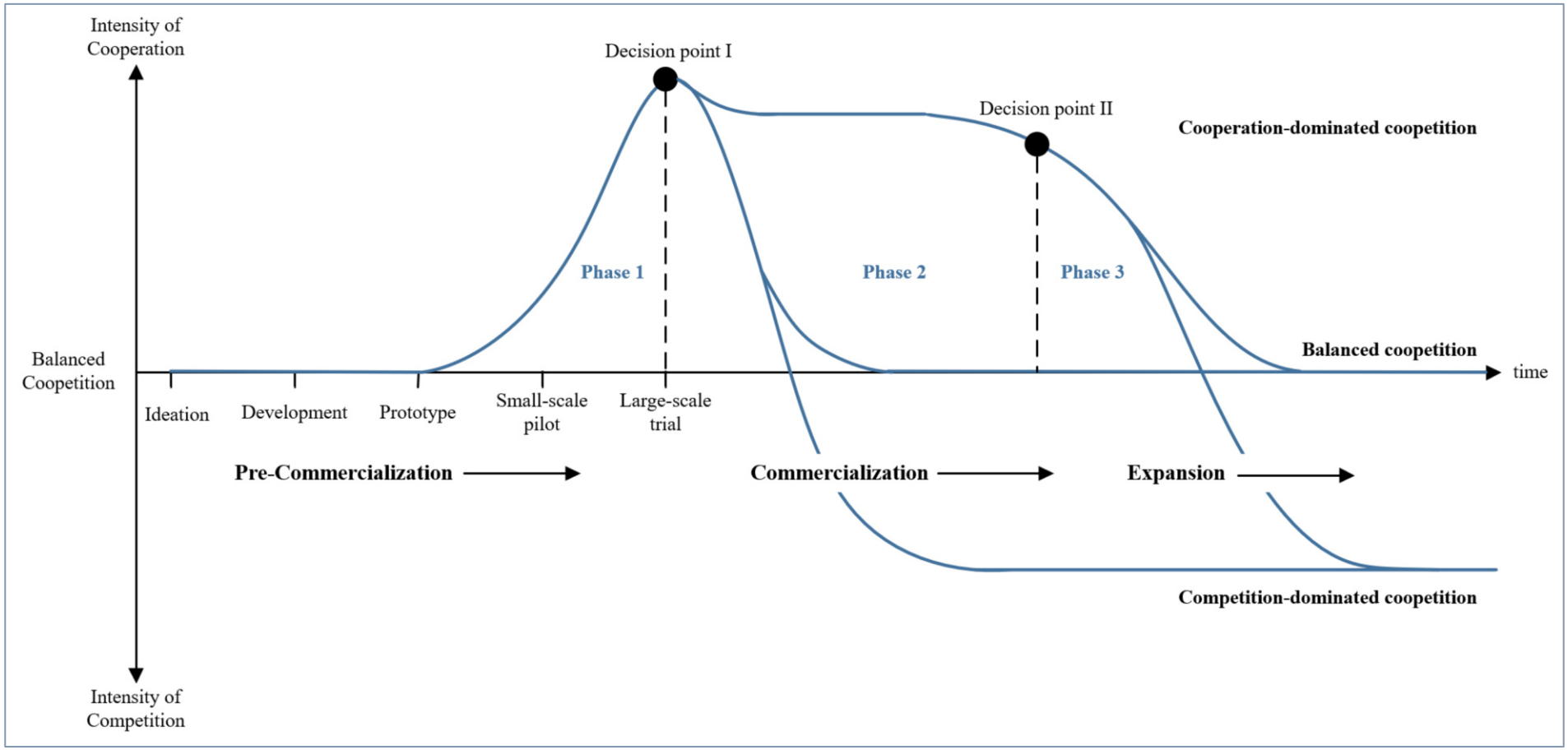

Figure 18: Coopetitive Balance throughout the Partnership, Source: own creation

Phase 1: Pre-Commercialization Phase

For the pre-commercialization phase, the start-ups again uniformly describe five distinct phases: ideation, development, prototype, small-scale pilot and large-scale trials. No collaboration with established firms takes place before the platform prototype is developed. After the prototype is completed, its viability needs to be tested and coopetitive partnerships are initiated. This is coherent with my findings from the previous chapter about the incumbents' motivations. These firms primarily aim to explore a potentially disruptive technology, and only an existing prototype renders this exploration possible. The first step of the partnerships is to conduct small-scale trials to demonstrate the functionality and viability of the platform.

After successfully piloting the prototype on a small-scale, the partners perform a trial on a larger scale to test the scalability of the solution. Here, the case companies leverage the customer base of the incumbents, approximately 200 to 1000 households, to demonstrate the resilience of the innovative blockchain-based solution on a larger scale. As testing the technology in large-scale trials represents the last step before commercial deployment, I discover that the cooperation intensity at this point reaches its maximum between the partners. This is confirmed by the SL of Start-Up S, elucidating that in this phase "everybody in [Start-Up S] is working on it". I see this structure throughout all four cases: while all operative employees of the start-ups are working on the collaborations, the incumbent is usually involved through their innovation department or with a team of their innovation business unit. Undoubtedly, until this stage, the coopetitive partnership is heavily imbalanced towards cooperative elements. Merely the inherently disruptive nature of the start-ups' product indirectly represents a competitive element in the first five stages (see Chapter 3.2).

Phase 2: Commercialization Phase

For the commercialization phase, I find that the interviewees describe different options to commercialize their product with each option having certain implications on the coopetitive balance. Hence, I define the end of the large scale-trial as the first decision point for the start-ups. After this point, the balance of cooperation and competition intensity is dependent on the chosen commercialization approach. The interviewees outline three diverging approaches: cooperation-dominant, balanced and competition-dominant, which I outline in the following.

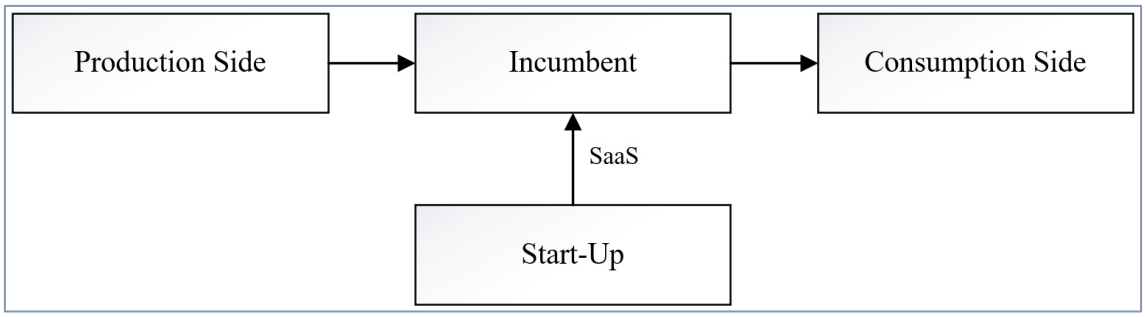

Figure 19: Relationship in Cooperation-Dominant Approach, Source: own creation

In the first option, the **cooperation-dominant approach**, the start-ups solely act as technology provider or consultancy and use their technology to enhance existing products of the incumbent companies (see Figure 19). To explain this relationship with the energy industry value chain, the incumbents become clients of the start-ups. As supplier, the start-ups pursue a Software-as-a-Service model to enhance the existing value proposition of the energy retailers, utilizing their innovative technology. Clearly, the intensity of cooperative forces preponderates. However, a competitive element is added in this phase, since the coopetitive partnerships become non-exclusive in this phase. The CMO of Start-Up E confirms this, explaining "if we are entering the market as a technology provider, we tend to develop partners quite naturally because the same kind of partners would be our distribution channels and our clients". While I find that before the decision point the start-ups focus on collaborations with one energy retailer in a certain market, they plan to open their services for incumbents competing in the same market.

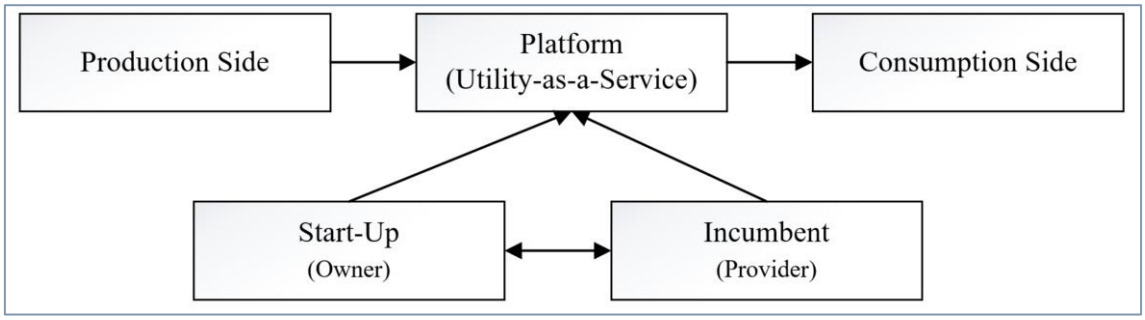

Figure 20: Relationship in Balanced Approach, Source: own creation

In contrast, the **balanced approach** is described as the second described option and comprises additional competitive elements. Here, incumbent and start-up join forces as equal partners to introduce a novel product to the market (see Figure 20). This platform-concept is coined by the interviewee of Start-Up U as "Utility-as-a-Platform". Like other platform concepts, this utility-like platform aims to empower third parties to trade a certain product or service with each other – in this case electricity. Utility-as-a-Platform,

in this case, does not mean that the energy retailers or utility companies are replaced by the platform. In fact, the established firm keeps a crucial role in this framework. Utilizing the role definitions of Van Alstyne *et al.* (2016), the incumbent becomes the provider of the platform, possessing the user interface as well as the customer relationship, while the start-up takes the role of the owner, controlling the intellectual property of the software. Nevertheless, the energy retailers are forced to cannibalize part of their traditional business because the platform allows producers to sell energy directly to consumers. The original value proposition of the energy retailers is rendered obsolete, as their function as an intermediary between production and consumption side is replaced by the platform. However, this platform concept provides an opportunity for a new more service-oriented business model for incumbent energy retailers.

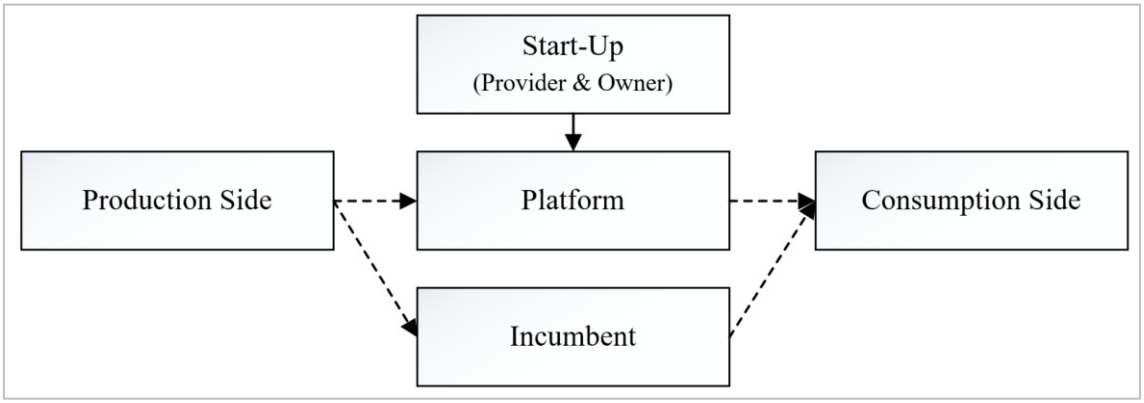

Figure 21: Relationship in Competition-Dominant-Approach, Source: own creation

The third option described by the interviewees is the **competition-dominant approach** to commercialization. Here, the start-ups directly undermine the value proposition of established energy retailers by enabling direct intermediation between producers and consumers through their platform (see Figure 21). In contrast to the balanced approach, the entrepreneurial firms act as both provider and owner of the platforms, operating the front-end as well as the back-end. While in the second option, the incumbent keeps the client relationship, the start-up completely disintermediates this relationship in the competition-dominant approach. In regard to the coopetitive balance, this means that the cooperative force dissipates entirely, resulting in a clearly prevailing competitive force.

Although the interviewees of the four start-ups elaborated on all three of these options, they concordantly decided to pursue the cooperation-dominant approach for the commercialization of their innovation. In their argumentation, they predominantly refer to the rationales I elucidated in the two preceding chapters, especially emphasizing the

high market entry barriers due to the regulatory and infrastructural environment. Additionally, they underscore their decisions with reasons why they refrain from choosing an approach with higher intensity of competitive forces. In particular, the Business Development Leaders of Start-Up A and Start-Up U explicate that the competition-dominant approach would entail competing with financially superior incumbent companies in a highly mature market. Interestingly, the balance shifts in the next phase.

Phase 3: Expansion Phase

As outlined before, all case companies follow a two-phase strategy, consisting of diverging commercialization and expansion strategies. Although the transition from commercialization to expansion phase is rather seamless, I observed that the end of the commercialization phase represents a second decision point for the start-ups. This decision again has major implications on the coopetitive balance. In contrast to the second phase, where all start-ups pursue a cooperative-dominant approach, in the third phase the strategies comprise stronger competitive forces. I find that in the long run, none of the start-ups plans to be solely a technology provider to improve existing products of established energy retailers. In fact, all four case companies envision to deploy their innovative platform solutions, two of them in collaboration with the incumbent, the other two independent of the incumbent. The expansion strategies of Start-Up A and Start-Up U envisage a balanced coopetitive partnership, deploying the platform in collaboration with the respective incumbent energy retailers. In comparison, the expansion strategies of Start-Up E and Start-Up S are competition-dominant, since both companies plan to emerge as direct competitors to the incumbent companies in the long-term. Regardless of this difference, this shows that the partnerships in all four cases become more competitive in the expansion phase.

To explain this observation, I distinguish two key drivers of this shift: external drivers and internal drivers. First, external drivers describe anticipated changes in the regulatory and infrastructural environment in favour of the start-up's solutions. Circling back to Chapter 4.2.1, entering the highly regulated energy industry without a partner is very difficult due to the regulatory complexity and uncertainty. However, as the regulations for the innovative solution begin to emerge, the "how-to rules" (BDL Start-Up A) are progressively defined, likely easing the market entry for the start-ups. As access to

infrastructure and regulatory compliance were two key motivation factors for start-ups for engaging in the coopetitive partnerships, the benefit in regard to these two factors decreases as a result of these anticipated regulatory changes in favour innovative solutions. Hence, the start-ups become less dependent on the partner, resulting in more balanced coopetition.

Second, internal drivers summarize the gradually diminishing value of the coopetitive partnership for the start-up over time. As analysed in the chapter before, the motivation factors of start-ups primarily aim to overcome market entry barriers and to secure survival in a critical time at the beginning of its development. However, in the early stages of the partnership, the start-ups are able to accelerate their growth as well as their traction rapidly, resulting in a decreasing marginal benefit of the collaboration over time. As a result, the cooperative force decreases after the start-ups have gained a foothold in the energy market. Both the external and the internal drivers explain the progressive inline of coopetitive balance towards competitive forces, as illustrated in Figure 18 (see p. 86).

Besides the general shift towards the competitive forces, I identify that the strategy of Start-Up E and Start-Up S is shifting more towards the competitive side in comparison to the strategy of Start-Up A and Start-Up U. While the latter two firms aim to collaborate with the incumbents in a long-term partnership, Start-Up S intends to follow a hybrid strategy – deployment in some countries with and in others without a partner – to eventually reach a "utility-like position" (SL, Start-Up S). Similarly, Start-Up E aims to become a full-service provider in the long-term, offering the platform without a partner and consequently pursuing an exclusively competitive strategy in the long-term.

I discover that the reason for Start-Up A's and Start-Up U's choice of the coopetitive strategy lies in the commercial environment. As most of the markets in which these two start-ups are became liberalised a long-time ago, fierce competition among incumbent energy retailers exist. Consequently, having a partner in these markets results in significant advantages. First, the incumbents are under the pressure to differentiate themselves from the competition. Hence, they are looking for innovative solutions such as the ones offered by the case companies. Second, competing with the incumbents would result in significant financial challenges for the start-up, as they had to approach customers individually. Although the challenges diminish after the start-up grew through

the cooperation-dominant commercialization, the advantages of the partnership with an established company persist in these markets.

> "60% of world's population lives in Asia and almost half of this population live in cities; and they are all connected to central power grids. Japan liberalised its power grid in 2016, China has done so in parts and Singapore will be the first in Southeast-Asia. As more countries liberalise their electricity markets, consumers will get greater choice in choosing their electricity retailers and the way they want to consume energy"
> (Whitepaper, Start-Up S)

This is different for Start-Up S, which is primarily operating in markets which only recently became increasingly liberalised. Since in regulated markets usually only centralized state-owned utility companies exist, competitive energy retailers have yet to enter these markets once it is permitted as a result of deregulation. Thus, the experience curve and scale advantages of incumbent firms are not yet existent in these environments, which results in reduced benefits of the partnership for the start-up.

In contrast, Start-Up E chose the competition-dominant long-term strategy for a different reason. The Estonian Start-Up focusses with its strategy on commercial customers, and as a result, the start-up aims to achieve economies of scale more quickly, since it bypasses the need for onboarding each customer individually. However, the cooperation-dominant commercialization approach is key to achieve accelerated growth as well as publicity to gain traction in the corporate segment. Both factors are key to establish network effects, spurring the growth of the platform. To summarize, I observed that the strategic focus on corporate customer reduces the benefits of a coopetitive partnership with incumbents and hence the start-up views the competition-dominant expansion strategy as most beneficial.

Analysing the coopetitive balance across the four cases, I identify several patterns. First, I observe that three alternative approaches to coopetitive partnerships with distinct coopetitive balance exist: cooperation-dominant, balanced and competition-dominant. This categorization is in line with previous research. For instance, Gnyawali and Charleton (2018) utilize the factor 'balance' to classify coopetitive balances and to deduce managerial implications for each of the three approaches. Further studies make use of the same categorizations, confirming the observed pattern (Luo *et al.*, 2016; Park *et al.*, 2014). Previous studies additionally link coopetitive balance with innovation outcomes. Luo *et al.* (2016) argue that value can only be created if the coopetition is balanced. While

their study analyses coopetitive partnership among equally sized companies, my findings contradict with this claim. Especially for partnerships among start-ups and incumbents, I discover that the balance naturally shifts over time as a result of several drivers.

As studies about the balance in this special kind of coopetition is very scarce, I decide to broaden the literature I take into account. From the field of commercialization strategies for high-tech start-ups, Gans and Stern (2003) argue that new entrants have to decide whether to cooperate or compete with incumbents. Similarly, Cozzolino and Rothaermel (2018) explain that either cooperation or competition are pursued as options between these players. However, based on the described findings, I argue that these results need to be extended. Besides cooperation- or competition-dominant, innovative start-ups have the possibility to commercialize and expand their offering in a balanced coopetition-strategy. In line with the findings of Van Alstyne *et al.* (2016), I indicate that digital platforms with its implications on competition are a key enabler for balanced coopetition strategies. Contributing their core competencies, start-ups act as owners and incumbents as providers, so that the partners coopetitively diffuse the innovation.

As the second pattern, I discover that the balance between cooperative and competitive forces is not stable throughout the coopetition process, but significantly shifts over time. The coopetition is initiated after the demonstration of technological viability but is heavily imbalanced towards cooperation in the early stages of the partnership. This imbalance is maintained in the commercialization phase, before cooperative forces dwindle, and competitive forces increase over time in the expansion phase. This confirms the findings of Gans and Stern (2003), who indicate that the partnerships are only initiated after the underlying technology of the innovation is proven. Furthermore, the observed shifting balance underscores the findings of Bengtsson *et al.* (2010), which portray coopetitive balance as a dynamic rather than a static phenomenon.

This pattern is further in line with the results of the study of Bengtsson and Kock (2000), which depict that high levels of cooperation are predominantly found in the early stages of product development. The same study further argues that customer proximity of activities correlates with increasing competition among the partners. As aforementioned, the literature about coopetitive balance in partnerships is still in a very nascent stage. Hence, I identified only the study of Ansari *et al.* (2016) contributing to this research area, arguing that balance shifts are a result of mitigating spill-over effects of actions on other

ecosystem partners. While my findings corroborate that customer proximity plays a role in the shifting balance, I can neither affirm nor contradict the finding of Ansari *et al.* (2016), as coopetition in an ecosystem is not the scope of my thesis.

As the third pattern in this context, I identified two distinct factors, which influence the coopetitive balance: external and internal factors. Taking the perspective of the start-up, external as well as internal factors are unfavourable for innovation diffusion at the early stages of the partnership. Externally, the regulatory and infrastructural environment complicates the market entry and expansion. Internally, the entrepreneurial firms lack skills and resources to accelerate its growth, to gain traction and eventually to establish network effects. As a result of the unfavourable circumstances, the coopetitive partnership is cooperation-dominant in the beginning. Over time, the balance gradually shifts again driven by external and internal developments. Externally, the 'liability of newness' decreases, as the regulators adapt policy frameworks to foster the innovative solutions. Internally, the benefits of the collaboration decrease since the marginal benefits behind the start-ups' main motivation factors 'publicity and credibility', 'acceleration and growth' as well as 'cooperative learning' progressively diminish. Apart from the aforementioned research findings of Ansari *et al.* (2016) and Bengtsson and Kock (2000), existing coopetition research largely falls short of explaining the reasons for the shifting balance.

Only Cozzolino and Rothaermel (2018) add to this research gap. They argue that the balance in the collaboration between an incumbent and new entrant becomes less stable over time, highlighting particularly the gradually diminishing value of the partnership over time. Confirming my argumentation that external factors influence cooperative and competitive forces, Cozzolino and Rothaermel (2018) explicate the impact of "environmental changes" on the coopetition (p. 3074). While the study only indirectly connected to the field of coopetition, Teece (1986) validates the importance of environmental factors, suggesting that these significantly influence the start-up's ability "to capture the profits generated by an innovation" (p. 287). Also not from the research area of coopetition, Gans and Stern (2003) highlight the importance of the environment on the commercialization strategies of start-ups, distinguishing excludability and complementary asset environment.

The significance of the internal factors on the coopetitive balance is confirmed by previous research as well. Based on previous findings of Dyer *et al.* (2018), Cozzolino and Rothaermel (2018) propose that resource complementarity decreases throughout the process of the collaboration. Hamel (1991) further adds that redundancies in skills and knowledge are likely to occur in the collaboration as time progresses, reducing the dependence from the partner. These findings largely corroborate the identified motivation factors for start-ups engaging in coopetition with incumbents (see Chapter 4.2.2). As I elaborated in that context, the start-ups are able to capture the benefits of the competition earlier than the incumbent, so that dependence declines over time.

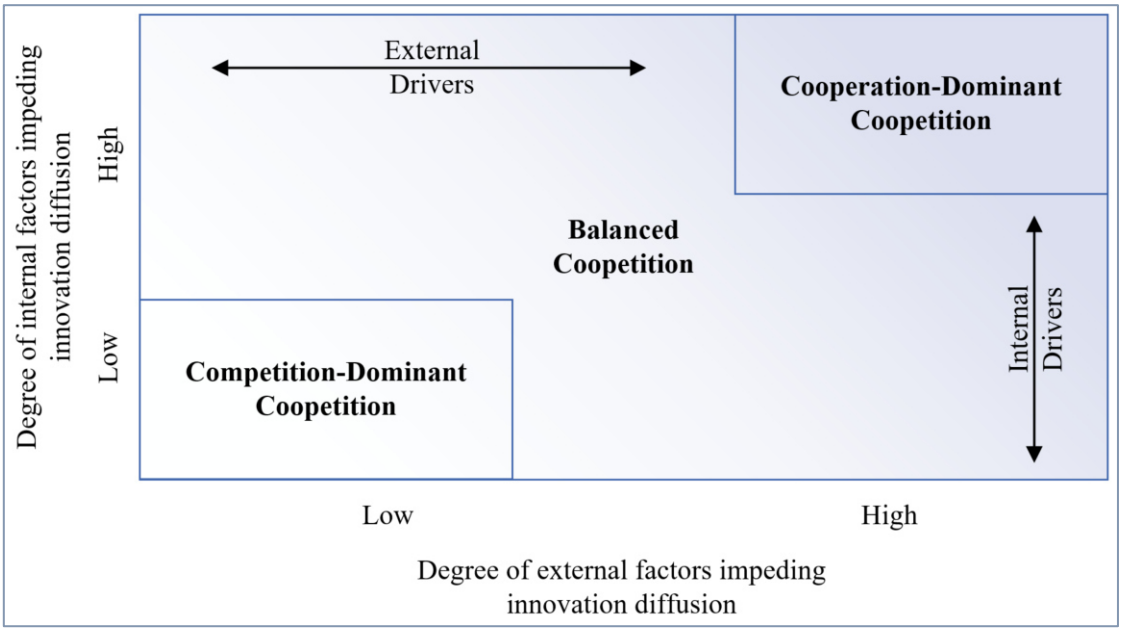

Figure 22: Impact of External and Internal Factors on Coopetitive Balance, Source: own creation

Summarizing the discussed findings of this section, I developed a schematic overview, which illustrates the impact of external and internal factors on the coopetitive balance (see Figure 22). As my study in line with previous research shows, if both external and internal factors impede innovation diffusion, the coopetitive partnership tends to be cooperation-dominant. Circling back to the case companies to exemplify this suggestion, at early stages of the partnership the companies lack access to infrastructure and regulatory approvals (external factors) as well as resources and knowledge to accelerate their growth (internal factors). As time progresses, an enhanced regulatory situation (external driver) and a decreased marginal benefit of the partnership (internal driver) reduce the cooperative and enlarge the competitive force in the coopetition, resulting in a

shifting balance. I further observed that the shifting balance inherits a high potential for tensions, which I further explicate in the following section.

4.2.3.2 Coopetitive Tensions

Due to the highly complex relationship between inhomogeneous partners, the involved parties need to be aware of potential tensions. By analysing the similarities and differences across the four cases, I discovered three distinct categories of coopetitive tensions: intertemporal divergence, dissimilarity of interests and inhomogeneity of cultures.

As introduced before, across all four cases I discovered an **intertemporal divergence** between the realization of benefits. More specifically, the start-ups are able to capture the value of the collaboration more quickly, since they aim to overcome market entry barriers and to receive support in a very nascent stage. In contrast, the incumbents need to invest resources and partially cannibalize their existing business to be able to capture value in the later stages of the collaboration. As the BDL of Start-Up U highlights, the incumbents have to take a "short-term pain to get a long-term gain".

This further leads to the second coopetitive tension, which I define based on the observations of each party's motivation. The start-ups primarily seek to accelerate growth, gain publicity and improve their market knowledge, whereas the incumbent seeks to explore a potentially disruptive technology and to build innovation capabilities. Clearly, both parties pursue fundamentally **diverging interests**, which can potentially result in coopetitive tensions hindering the value creation and appropriation processes.

The third tension, the **dissimilarity of cultures**, stems from the inhomogeneity of the parties involved in the collaboration. The SL of Start-Up S particularly exemplifies that his firm "would like to move faster and try to deploy earlier and […] do more things", but the incumbent's corporate culture impedes this agility. He defines the incumbent partner as rather "risk averse", which undoubtedly leads to potential tensions. This notion is confirmed by the other case companies. For instance, the Co-Founder and Managing Director of Start-Up A elucidates that his firm generally wants to "make a big splash and dive into large scale rollouts", but he acknowledges that "smaller trials can be a better fit for potentially trepid energy partners".

Enfolding existing literature, I discover that only the tensions emerging from diverging interests have widely been confirmed by literature on coopetition (i.e. Bengtsson and Kock, 2000; Gnyawali *et al.*, 2016). As an explanation for this tension, Ritala and Hurmelinna-Laukkanen (2013) suggest that this tension stems from role conflicts in the value creation phase due to opposing logics. Confirming the risk of conflicting interests in coopetition, Ansari *et al.* (2016) introduce intertemporal divergence as a second source for coopetitive tensions, which corroborates the explanation of the interviewees. However, I argue that this factor is only prevalent in coopetitive partnerships between start-ups and incumbents because the motivations and thus the time frame of benefit realization are more similar if the partners are homogenous. Lastly, I discover that previous research has not linked the dissimilarity of cultures with coopetitive tensions. While Lin and Sun (2010), as well as Petter *et al.* (2014), argue that a reduced distance of both partners' corporate culture is important for the success of coopetition, I suggest to define this particular factor as a significant source for coopetitive tensions – especially in collaborations between inhomogeneous partners such as start-ups and incumbents.

Based on these observations and discussions, I further observe the pattern that the potential for tensions is more prevalent in coopetitive partnerships between start-ups and incumbents than for those among equally sized parties. Clearly, the interests between inhomogeneous partners are diverging to a larger extent, resulting in an enlarged potential for intertemporal tensions. Moreover, the dissimilar cultures add to the already increased potential. Taking previous research into account, I find that Ansari *et al.* (2016) and Hora *et al.* (2018) substantiate this suggestion. No studies have been identified, which repudiate the claim that tensions in inhomogeneous coopetitive partnerships are more prevailing than in homogenous ones.

Due to the increased potential for tensions, it is particularly crucial in coopetitive partnerships between start-ups and incumbents to mitigate risk factors. Hence, I describe critical success factors for these partnerships in the subsequent section.

4.2.3.3 Critical Success Factors

As the coopetitive partnership is a crucial step in the commercialization and expansion strategy of the four start-ups, they rely on the success of the collaboration. To maximize the success of the coopetition, several factors play a crucial role. Based on the preceding sections, I recognize **management of coopetitive balance** as well as **management of**

coopetitive tensions as two very crucial factors for success. For the identification of further critical success factors, I conduct a semi-quantitative analysis. As Figure 23 indicates, four factors are highlighted by all case companies and one factor is mentioned by three of them. In the following, I elaborate on these dominant factors.

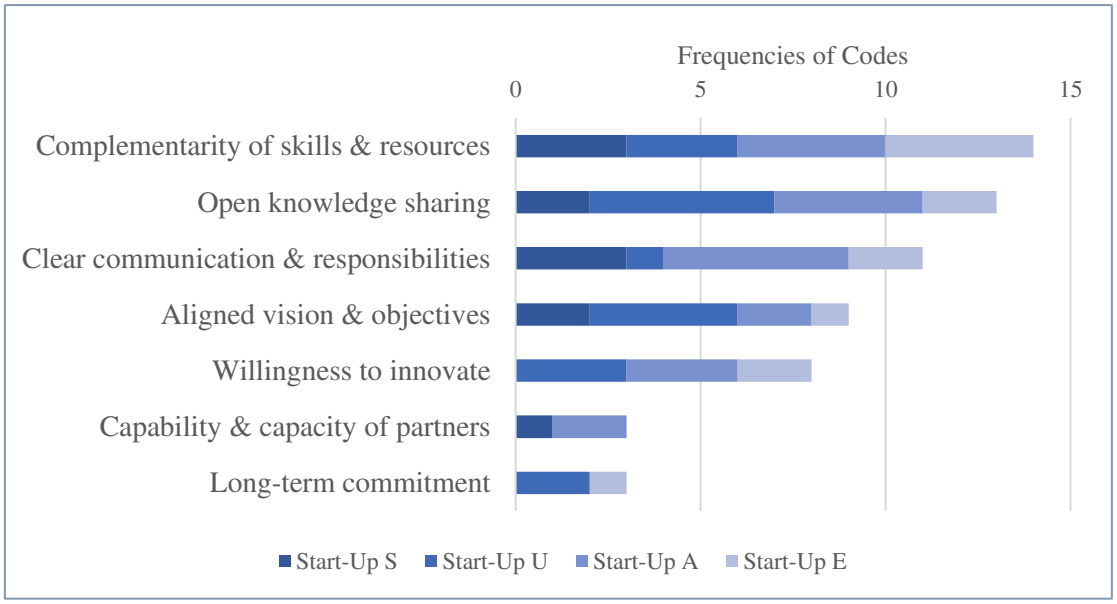

Figure 23: Critical Success Factors, Source: own creation

The most dominant factor is the **complementarity of skills and resources**. This factor describes that the partnerships allow each partner to obtain access to new skills and resources. I find that the interviewees deem their technology as well as their innovativeness as the most important resource they contribute to the partnership. From the other perspective, the incumbents bring deep market knowledge, an existing customer base and the necessary capital into the partnership. The second critical success factor is **open knowledge sharing**. Only sharing of knowledge and experiences enables each party to capture the benefits of the collaboration to create value on both the joint- and the firm-level. While none of the case companies refuses to share knowledge about blockchain-technology or the functionality of the end product, they uniformly agree that they keep their source code confidential as their unique intellectual property. However, Start-Up U and Start-Up E explain that knowledge protection does not play a central role in the collaboration. Both firms justify the reduced necessity for official knowledge sharing and protection guidelines with the fast-paced environment, which rapidly changes the underlying technology.

Clear communication and responsibilities foster open knowledge sharing. For this reason, the start-ups emphasize that this factor has a strong impact on the coopetition success. The following quote underscores that a well-structured collaboration is key to success:

> "Open communication throughout the entire process is very important because sometimes it means foreseeing the unforeseeable. That means sometimes there are things that you could never have seen and what you need to do is have those open communication lines in place. At least the process where innovation can be fed back into the broader theme. At least that you know who is holding the ball and what is next." (BDL, Start-Up A)

Aligned vision and objectives is the fourth critical success factor mentioned by all case companies. The interviewees particularly emphasize that if a partnership lacks a thorough fundament – shared vision and goals – the progress of the collaboration is significantly impeded. Aligned objectives are required to ensure that both parties are moving in the same direction. The fifth critical success factor represents the **willingness to innovate** of both the start-up as well as the incumbent involved in the coopetition. As the BDL of Start-Up A illustrates, "the catalyst for that [the project's success] is the openness and willingness for incumbents to innovate". Start-Up S does not directly mention this factor as critical for success. However, the SL emphasizes that his firm only chooses "very forward-looking" partners, indirectly emphasizing the need for a certain degree of willingness to innovate from the incumbent's side. As the remaining two factors, **capability and capacity of partners** as well as a **long-term commitment,** are not uniformly supported by all four case companies and thus not dominant, I refrain from elaborating on those in this section.

By analysing the seven dominant critical success factors, I discover the pattern that these factors aim to maximize the utility of the coopetitive partnership at different stages. At the beginning of this partnership between start-ups and incumbents, the building of a thorough fundament is essential. This fundament is laid by the parties by focussing on resource complementarity as well as willingness to innovate during the partner choice. During the initiation phase of the partnership, aligning vision and objectives as well as installing clear communication structures and responsibilities aim to proactively reduce friction and to enable knowledge sharing. During the coopetitive partnership, the

continuous management of coopetitive balance and coopetitive tensions is important to allow joint value creation. Taking previous research into account, I discover that complementarity of resources (Bengtsson and Kock, 2000; Hora *et al.*, 2018), as well as open knowledge sharing and clear communication and responsibilities (Bouncken *et al.*, 2015; Gast *et al.*, 2019), are widely acknowledged as critical success factors. Furthermore, existing literature clearly describes the management of coopetitive balance and tensions as important for success (Chen *et al.*, 2007; Gnyawali and Charleton, 2018). However, I discover that willingness to innovate and aligned vision and objectives are not particularly termed crucial for value creation through coopetition. While Bengtsson and Kock (2000) and Hora *et al.* (2018) indicate innovation capabilities as a significant factor, I claim that it has to be extended to innovation capability and willingness. As the BDL of Start-Up A explained, willingness is the "catalyst" for innovation. Hence, without the willingness, the capability is futile. Even though aligned vision and objectives is only indirectly defined by Hora *et al.* (2018) as important for success, I claim that it represents an additional success factor. The alignment between the partners is especially central coopetition between inhomogeneous partners, since this facilitates working towards a common goal, so that potential tensions are pre-emptively reduced.

Synthesizing the emerging patterns of this section, I summarize that the balance of cooperative and competitive forces varies considerably throughout the coopetition process, dependent on the chosen commercialization and expansion strategies of the start-ups. Furthermore, I identify external and internal drivers which significantly impact the coopetitive balance over time. Not only the shifting coopetitive balance, but also the divergent interests and cultures represent significant risks for the collaboration. However, these risks can be mitigated before and during the partnership by leveraging seven identified critical success factors. By considering these, the start-ups and incumbents aim to create value and diffuse the disruptive innovation. Hence, in the next chapter, I amplify the impact of coopetition on the diffusion process of disruptive innovation.

4.2.4 Diffusion of Disruptive Innovation through Coopetition

The eventual goal of the coopetition between start-up and incumbent company is diffusion of the P2P trading platform in the energy industry. While the preceding sections have already elucidated the motivations for and the process of coopetition, this section elucidates the impact of coopetition on innovation diffusion. Interestingly, only minor differences among the four cases exist. Based on my empirical findings, I create Figure 24 to schematically visualize the impact of coopetition on the adoption of the platforms. The three phases are coherent with those of the coopetition process: pre-commercialization, commercialization and expansion phase.

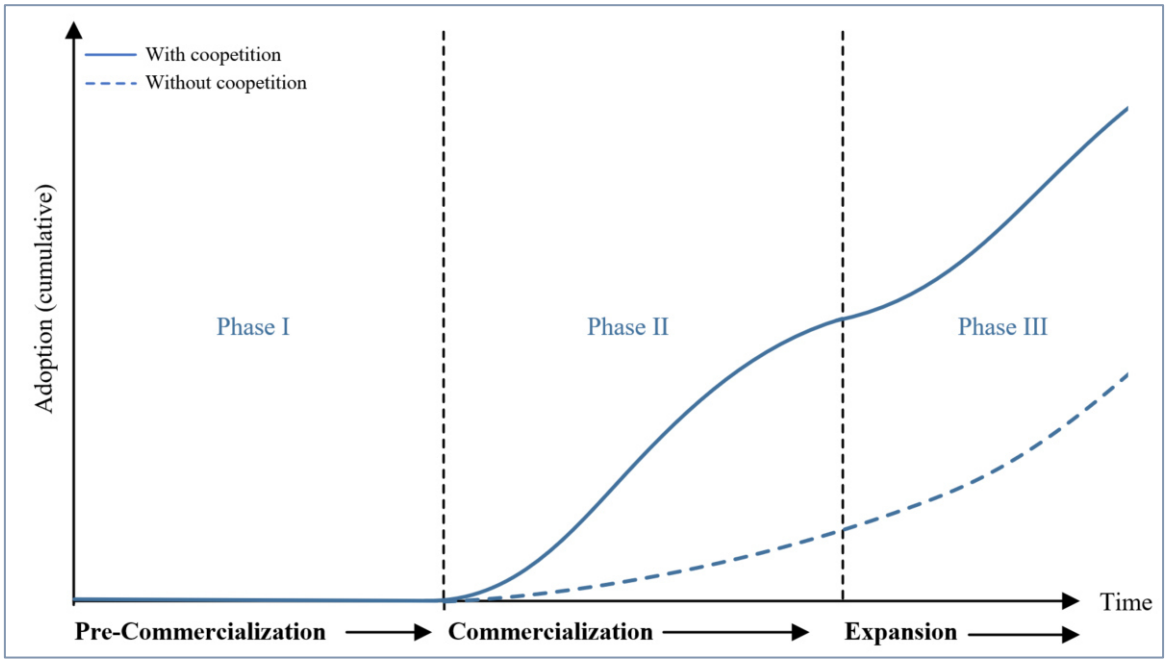

Figure 24: Innovation Diffusion Process through Coopetition, Source: own creation

In the first phase, until the large-scale trial, the adoption of the start-ups' products is negligible. I find that especially the novelty and complexity of the product in combination with the traditionally slow-moving energy industry protract the innovation diffusion in the beginning. The BDL of Start-Up A metaphorically illustrates the impact of the coopetition in this phase with the following quote:

"I do not know if you know about moving an object over a surface with a lot of friction. To move the object, you need to overcome the static friction, and then the object is rolling and that requires much less force. And I would say having this initial discussion that's the force to overcome friction. And then the deploying of the technology […] is the rolling of the object." (BDL, Start-Up A)

With this metaphor, he refers to the increased adoption after the collaboration with the incumbent company is started. The coopetitive partnership enables the start-up to overcome the obstacles to commercialize the disruptive technology. All start-ups agree that the innovation diffusion would be slower if not impossible without a partner in this phase. While the interviewee of Start-Up S defines it as “critical” (SL), the BDL of Start-Up U utilizes the word “crucial”.

In the commercialization phase, the previously described cooperation-dominant coopetition accelerates the innovation diffusion. However, in this phase I observe that the start-ups do not commercialize their actual solution, but offer the underlying technology to incumbent companies, which allows these incumbents to enhance their existing offering. The BDL affirms this observation, explaining that his start-up is “taking the Clayton Christensen approach to disruptive innovation, which is bottom-up. So, solve a few small problems and keep the low-hanging fruits and then grow the company from there”. Coherent with the findings described in the last chapter, I discover that the marginal impact of the coopetition on the adoption decreases over time. After the major obstacles of entering the market are overcome and the new entrant gained foothold in the market, the start-up expands its offering and, once the commercial environment allows, starts introducing their P2P energy trading platforms.

Interestingly, I observe that the whole diffusion process of the start-up’s platforms is not directly described as ‘disruptive’ by the start-ups. While they see their innovation as ‘disruptive’, they emphasize that they not aim to ‘disrupt’ the energy industry. The CEO and Co-Founder of Start-Up U underscores that “this is not a revolution or a disruption. It is an evolution”. The Co-Founder and Managing Director of Start-Up A confirms that “the industry needs to be disrupted in a managed a progressive way, rather than in a completely dysfunctional way”.

By analysing the impact of coopetition on the innovation diffusion process, I discover an emerging pattern. In coherence with the two-phase strategy pursued by the start-ups, the case companies adapt their offering over time. While in the beginning, all of the four case companies use their technology to improve the incumbents offering, in the second phase they aim to provide a more holistic platform solution. Utilizing the distinction of Christensen (1997), it becomes clear that in the first phase the coopetition diffuses a sustaining innovation, as it improves the existing offering along the traditional

performance trajectory by making it more efficient. However, in the second phase, the coopetition diffuses a disruptive innovation, since the platform offers new value propositions as outlined in Chapter 3.2.

After a comprehensive review of additional literature, I only identify the research of Ansari *et al.* (2016) as targeted on the shifting nature of the innovation. Interestingly, their study states that the innovation of the case company is "increasingly viewed as a sustaining force instead of the initially perceived disruptive influence" (p. 1844), which contrasts with my finding. Ansari *et al.* (2016) further elaborate that the reframing from disruptive to sustaining innovation helps to secure the support of incumbent companies. I claim that environmental characteristics are the explanations for the opposing findings. The research of Ansari *et al.* (2016) takes place in the television ecosystem, which is inherently "systematic and complex, with multiple sides and conflict-ridden relationships within and across sites" (p. 1850). As the complexity in combination with the multiple sides is the biggest challenge for the disruptive entrant, the case company is forced to adjust the perception of its product. In contrast, the biggest challenge for the case companies of my study is described as the regulatory circumstances and uncertainty. Due to this challenge, the start-ups choose to enter the market with a sustaining innovation to overcome the liability of newness by collaborating with incumbent companies. Consequently, I argue that the finding of previous literature does not repudiate my finding, but rather highlights the importance of the circumstances. For markets with high entry barriers due to regulations, I claim that start-ups ease the commercialization by entering with a sustaining innovation and thus by accomplishing incumbent's support.

In this section, I explained similarities and differences across the cases to identify and discuss emerging patterns in the next step. These steps represent the second and third stage of the methodological approach outlined in Chapter 3.2. The fourth stage of this process explained in the subsequent section.

4.3 Modification of Theoretical Framework

Based on conclusions from the literature review, I developed a theoretical framework to guide the empirical part of this study. After I systematically executed and described the first three stages of the methodological approach in the preceding two sections, this section presents the final framework (see Figure 25). This modified framework is the result of constant iteration between empirical data, emergent patterns and existing literature. In the following, I first introduce the alterations to the theoretical framework, before I answer the research questions with the help of this framework.

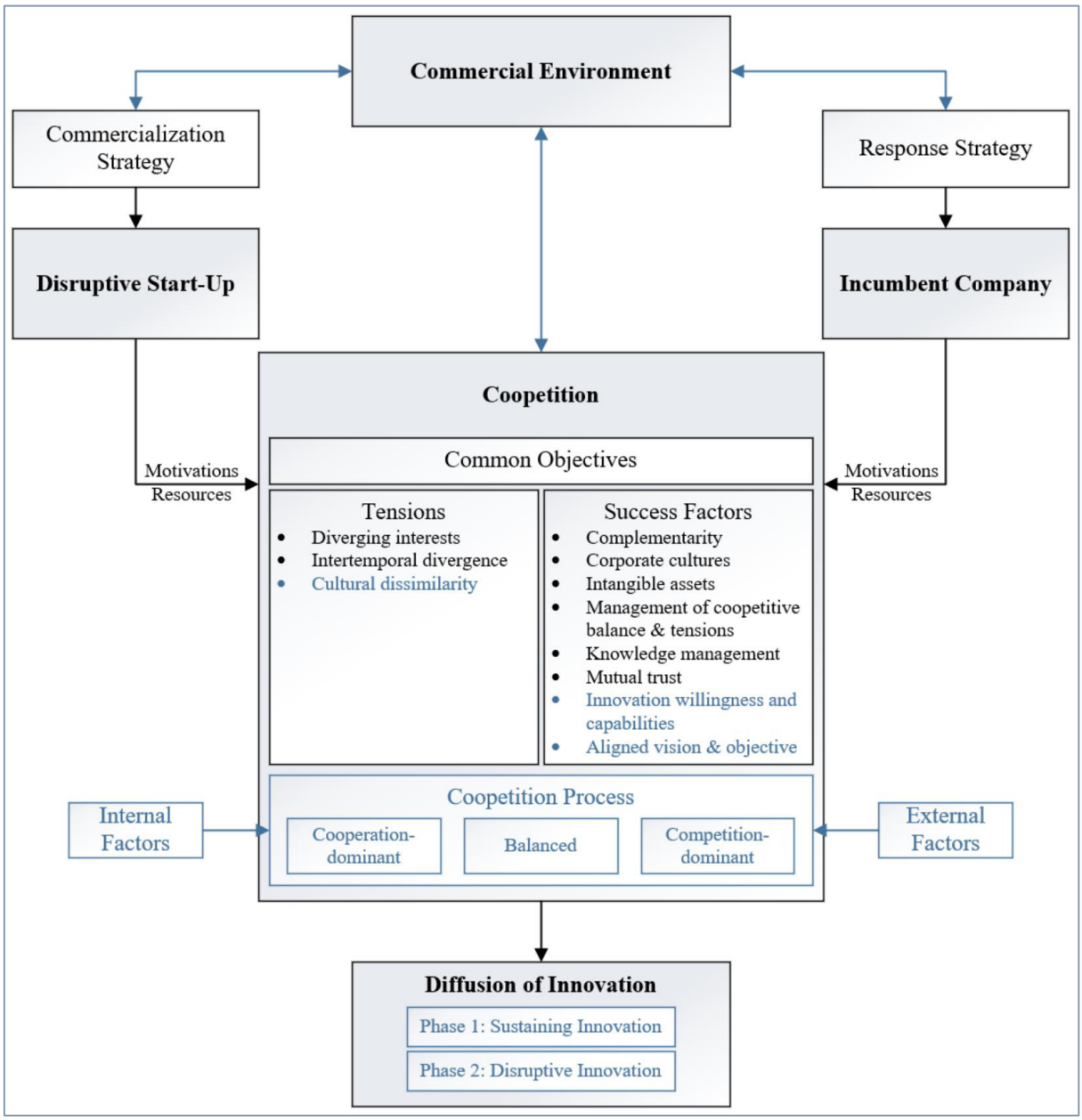

Figure 25: Revised Theoretical Framework, Source: own creation

As a result of the iterative process, I modify several areas of the initial theoretical framework. First, I identify a strong reciprocal relationship among commercial environment, coopetitive partnership as well as each partner individually. While all case companies highlight the commercial environment as a significant challenge, two of them are involved in governmental inquiries to contribute to a future policy framework which defines the "laws of the game" for their innovative platform solution. Second, the comparison of my empirical findings with existing theory suggests that the inhomogeneity of the two parties results in increased tensions throughout the coopetition process. Not only are the previously identified two sources for tensions more significant, but also inheres the clash of the start-up mentality with the traditional mindset of the incumbent additional conflict potential. To mitigate this risk, I identified innovation willingness as well as aligned vision and objectives as two additional critical success factors, which I added to the framework.

Third, I complement the initial theoretical framework with more specific findings of the coopetition process, distinguishing cooperation-dominant, balanced, and competition-dominant partnerships. While these three options are closely linked with each other, I discover that both internal and external factors significantly influence the balance. Lastly, I specify the innovation diffusion process by including the shifting nature of the innovation in the visualization. Based on the existing literature, the empirical findings and the modified theoretical framework, I answer the research questions of this study in the following.

SQ1: How does the commercial environment impact the strategies of disruptive start-ups?

Although the case companies are operating in diverging geographical and regulatory environments within the energy industry, all four start-ups highlight the impact of the commercial environment on their strategy. More specifically, I observe that the regulatory uncertainty, as well as the regulatory barriers, are defined as two factors. In coherence with findings of previous research from Bhide (2000), I identify the pattern across the four cases that "innovation is outpacing regulation", as the Business Development Leader of Start-Up A illustrated. Besides the non-existing regulations, also the existing regulations represent an obstacle for the market entry. As demonstrated by previous research, I argue that these regulations can represent a significant market entry barrier

and thus a substantial challenge for start-ups to diffuse disruptive innovations (i.e. Christensen *et al.*, 2004).

As a response to the adverse commercial environment, I observe that the four case companies pursue a flexible two-phase strategy. In the first phase, the firms plan to enter the market through a partnership with an incumbent retailer. In the second phase, the start-ups amend their strategy in anticipation of favourable regulatory changes. In this context, these favourable regulatory changes are defined not only as alternations of existing policy, but also the emergence of new policies, which guide the deployment of the start-ups' innovations. The review of existing literature corroborates my findings on the need for flexible and adaptable strategies in the early stages of a venture (Christensen and Raynor, 2003).

SQ2: Why do disruptive start-ups and incumbent companies pursue coopetitive partnerships?

Based on the frequencies of the motivation factors of my inductive coding approach, I identify several motivation factors for start-ups and incumbents engaging in coopetition. Interestingly, both the motivation factors itself as well as the timeframe of realizing the underlying benefits are highly divergent.

By collaborating with incumbents, disruptive start-ups intend to overcome market entry barriers and enhance their competitiveness during the critical early stages of the innovation commercialization and expansion. In particular, the young firm aims to gain access to infrastructure and regulatory compliance to enter the market. After market entry, the start-up seeks to enhance its chance to survive by benefiting from publicity and credibility, cooperative learning, as well as the incumbent's market knowledge and power through the coopetitive partnership to accelerate its growth. These factors are confirmed by previous studies, only regulatory compliance is an exception here (i.e. Bengtsson and Kock, 2000; Gnyawali and Park, 2009). However, based on the analysed primary and secondary data, I find strong support that this factor is significant, especially in highly regulated industries.

Across the four cases, I observed that the established players primarily aim on long-term benefits with engaging in coopetitive partnerships with disruptive start-ups. Exploring a new technology and building innovation capabilities are two rationales to avoid being

disrupted in the long-term. Once the technology reached a certain degree of maturity, the incumbents further intend to differentiate their offering with the help of the innovative partner. Synthesizing the two perspectives, it becomes evident that the start-up is able to realize benefits of coopetition before the incumbent. Quoting the Business Development Leader of Start-Up U, the incumbents have to be interested in "cannibalizing themselves" and face "a short-term pain to get a long-term gain". Although this intertemporal divergence is strongly substantiated by my empirical findings, previous literature about this phenomenon is scarce. While no study contradicts with this finding, Ansari *et al.* (2016) corroborate the identified time-lag.

SQ3: How are coopetitive partnerships between disruptive start-ups and incumbent companies performed?

Analysing the coopetition process across the four cases, I observe that the balance of cooperative and competitive forces significantly shifts over time. In accordance with previous research from Gnyawali and Charleton (2018), I categorize cooperation-dominant, balanced and competition-dominant coopetitive partnerships. While at the beginning, the balance is inclined towards the cooperative force, I discover a gradual shift towards the competitive force as time progresses and the partnership matures, confirming the findings of Bengtsson and Kock (2000).

Iterating between previous literature, empirical data and emerging patterns, I determine two criteria influencing this balance: external and internal factors. The external factor summarizes the commercial environment in combination with the aforementioned "liability of newness", which impede the innovation diffusion. The internal factor conflates the decreasing marginal benefits of the coopetitive partnership for the start-up as time progresses. Here, the reason is that the start-up is able to capture the benefits early in the coopetition process, so that, for instance, the resource and skill complementarity diminishes over time. Since Ansari *et al.* (2016) affirm my finding of the shifting balance and Cozzolino and Rothaermel (2018) corroborate the influence of time on the coopetition between start-up and incumbent, I claim that this empirical finding closes the research gap on the reasons for the shifting balance in these special kind of coopetitive partnerships.

Synthesising these new insights, I introduce a model that depicts that if external and internal factors impede the start-up's innovation diffusion, the coopetitive balance tends

to be cooperation-dominated, since the start-up is more dependent on the incumbent than the other way around. In contrast, if the internal and external factors favour the start-up's innovation diffusion, the partnerships tend to be more inclined towards the competitive force.

Further answering the third sub-question, I claim that the significantly shifting balance, as well as the divergent motivations of each party, increase the potential for coopetitive tensions, which is confirmed by previous research (i.e. Ansari *et al.*, 2016; Gnyawali *et al.*, 2016). In fact, I add the cultural dissimilarity as an additional source for tensions, complementing previous research on coopetitive tensions. As a result of the shifting balance and evolving tensions, I identify the management of coopetitive balance and tensions as two critical success factors. I further confirm complementarity of resources, open knowledge sharing and clear communication and responsibilities as factors crucial for coopetition success (i.e. Bengtsson and Kock, 2000; Hora *et al.*, 2018). Adding to existing theory, I additionally define aligned vision and objectives and willingness to innovate to be significant criteria for success.

SQ4: How do coopetitive partnerships between disruptive start-ups and incumbent companies promote the diffusion process of disruptive innovation?

By leveraging complementary skills and resources as well as cooperative learning during the partnership, start-ups and incumbent companies collaboratively overcome market entry barriers and promote the innovation diffusion. Interestingly, taking the distinction of Christensen (1997), it is not throughout the whole process a disruptive innovation being promoted. I identified that the start-ups pursue a cooperation-dominant coopetition during the first stage to convince partners of the collaboration. In this phase, the start-ups improve the existing offering of the incumbent, which is defined as sustaining innovation. As time progresses, start-ups seek to expand their offering to a platform-solution, disintermediating the traditional business model, which is defined as disruptive innovation. Only the study of the television industry by Ansari *et al.* (2016) indicate a shift between sustaining and disruptive innovation within the same coopetitive innovation diffusion process. However, I demonstrate a shift into the opposing direction – from sustaining to disruptive nature.

RQ: How are start-ups disrupting a highly regulated industry through coopetitive partnerships with incumbent companies?

Answering the main research question of my thesis, I propose that start-ups disrupt a highly regulated industry through coopetitive partnerships with incumbent companies in two successive stages. In the first stage, the start-ups engage in cooperation-dominant partnerships to improve the existing product offering of the incumbent through sustaining innovation. As time progresses and external as well as internal factors become more favourable for the start-up's innovation diffusion, the partnerships become increasingly competitive. Consequently, in the second stage, the start-ups expand their product to a platform solution, rewriting the rules of cooperation, competition and coopetition, and disrupt the industry either independently or in collaboration with the incumbent company.

5 Conclusion

Disruptive start-ups have already transformed the landscape in a variety of industries. Among the most prominent examples, Airbnb and Uber redefined the hospitality and taxi industries, respectively, through their innovative platform business models, threating the value propositions of incumbent companies. However, other industries, such as healthcare and energy, have yet to experience such a strong digital transformation. According to Michael Barnard, the interviewed expert, this is due to the high entry barriers and, in particular, due to the complexity and importance of the functionality of these industries for companies, households, and society.

While overcoming these barriers is undoubtedly difficult for start-ups, their high-tech solutions have the potential to significantly impact the most pressing challenges of humankind: climate change and universal health. Hence, I started reviewing the literature on how start-ups can diffuse these innovations in these environments. This led me to identify the research gap in the conjunction of disruptive innovation theory and coopetition: partnerships among disruptive start-ups and incumbents in highly regulated industries. This area reflects the combination of explicitly stated research gaps by leading authors in these fields (Bouncken *et al.*, 2015; Christensen *et al.*, 2018; Ritala *et al.*, 2016). Consequently, I defined the following as the research question: *"How are start-ups disrupting a highly regulated industry through coopetitive partnerships with incumbent companies?"*. In the following section, I summarize the main findings, theoretical contributions, and managerial implications of this study. Additionally, I discuss its limitations and provide suggestions for future research.

5.1 Main Findings

Guided by the theoretical framework and the research questions, I am able to summarize the key findings of this thesis in three points. First, I identified an intertemporal divergence in the realization of benefits, which increases the potential for coopetitive tensions among the partners. In particular, the start-up realizes the benefits, underlying the motivations for engaging in a coopetitive partnership, in earlier stages than the incumbent. The entrepreneurial firm intends to overcome market entry barriers and to secure survival in the early venture stages, whereas the incumbent seeks to differentiate itself in the long term, avoiding disruption by new entrants. Only the study of Ansari *et al.* (2016) confirms this intertemporal divergence and the resulting potential for tensions.

The lack of previous findings of this pattern indicates its specificity to relationships between heterogeneous partners, since studies about equally large coopetition partners omit the mention of these dissimilar motivations and the resulting time-lag in realization of benefits (Bengtsson and Kock, 2000; Bouncken *et al.*, 2018).

Second, I developed a model to explain the shifting coopetitive balance between cooperative and competitive forces, based on observations of the balance in different stages of the coopetition process. I claim that external and internal factors influence the coopetitive balance. In accordance with research in the field of coopetition (Cozzolino and Rothaermel, 2018) and competition (Gans and Stern, 2003; Teece, 1986), I demonstrate that the commercial environment as the external factor has a significant impact on the balance. If variables such as regulations and customer behaviour favour the innovation of a start-up, I find that the coopetitive partnerships with incumbents are more inclined towards the competitive force. In accordance with previous findings in the research area of coopetition, I further define that an internal factor plays a role (Cozzolino and Rothaermel, 2018). The internal factor consists of the resources and knowledge required to accelerate the growth of the start-up. My analysis shows that at the beginning of the coopetitive partnership, the internal factors do not favour the start-up's position, as the start-ups require complementary resources and skills from the incumbent. Over time, the skillset and resource configuration of the start-up becomes more favourable, resulting in a reduced cooperative force.

As both the external and the internal factor become increasingly favourable for the start-up over time, I observed that the balance shifts from cooperation-dominant to balanced or even competition-dominant. While these two factors have been derived from literature on coopetition among partners of equal size, I again discover a key difference in the context of heterogeneous partnerships. Across the four case companies of this study, I observed that two of them pursue a balanced coopetition in the expansion phase, deploying their platform in close collaboration with the incumbent. This is special for the heterogeneous coopetition, since, for instance, Bengtsson and Kock (2000) concluded contradictory findings on homogeneous coopetition, claiming that marketing and sales activities are usually dominated by competition.

Third, I find that the flexible two-phase strategy of the start-ups combined with the coopetitive partnership demands a certain category of innovation. During the first phase,

the cooperation-dominant phase, the start-ups utilize their technology to improve the existing products of the incumbent – a sustaining innovation per definition. However, in later stages of the coopetition, the start-ups expand their offering to a platform solution, which represents a disruptive innovation. The transition from sustaining to disruptive innovation is not corroborated by previous literature, only Ansari *et al.* (2016) observed an opposite transition. Comparing this again with previous findings on coopetition among equally sized firms, I cannot identify any supporting or contradictory findings. Previous research in this field does not focus on transitions of sustaining to disruptive innovation, but only distinguishes the impact of different kinds of collaboration on innovation performance (Soriano, 2016; Ritala and Hurmelinna-Laukkanen, 2009; Yami and Nemeh, 2017).

Synthesizing the three key findings of this study, I draw the conclusion that a clear distinction between coopetition among start-ups and incumbents, and coopetition among equally-sized partners is required. In the former, dissimilar motivation factors lead to a uniquely shifting coopetitive balance, inhere additional coopetitive tensions and require particular factors to ensure success. Furthermore, the innovation diffusion process is observed to be special in this coopetition type. Hence, I suggest the term "heterogenous coopetition" for partnerships between unequally sized partners, such as disruptive start-ups and incumbents. The theoretical contribution of this novel term is further illustrated in the following section.

5.2 Theoretical Contributions

This thesis was guided by the gaps and opportunities, which were identified in the literature review. It contributes to previous research threefold, since it adds to the fields of disruptive innovation theory, coopetition as well as the conjunction of both.

In the context of disruptive innovation theory, this study follows the call from Christensen *et al.* (2018) and further elucidates certain industry dynamics which significantly impact the trajectories of disruptive innovations. More specifically, I illustrated based on cases in the energy industry that the regulatory and infrastructural environment represents a clear boundary condition for disruptions. The presence of unfavourable external factors has the potential to significantly impede or even to completely prohibit the disruption of an industry. Furthermore, I contribute novel findings about the disruption strategies of start-ups as well as response strategies of the incumbents to existing research in this field.

In particular, this study shows that disruption and response strategies of both parties can be conjoined in the framework of coopetitive partnerships, so that these firms rather collaborate than compete with each other. To initiate these collaborations, this study shows that the nature of innovations does not have to be either disruptive or sustaining, but potentially transitions over time. This is in coherence with the findings of Ansari *et al.* (2016), but I observed an innovation type shift into the opposing direction.

In the research area of coopetition, this study aimed to contribute to several research gaps. First, I explain how the commercial environment impacts the coopetitive balance throughout the process of coopetition. Previously defined as a research opportunity by Soppe *et al.* (2014), I depict that the coopetitive balance is dependent on the presence of environmental factors. If the environmental factors are favourable for the diffusion of innovation, the coopetitive partnership tends to be rather competition-dominated. Second, I follow the suggestion of Bouncken *et al.* (2015) and Ritala *et al.* (2016) by analysing coopetition among start-ups and incumbent companies and consequently identified key distinctions for this special kind of coopetition as outlined in the main findings. This led me to defining the term "heterogeneous coopetition" for partnerships among unequally sized partners, such as disruptive start-ups and incumbent firms. With the introduced theoretical framework, I aim to build upon and to combine previous research in this field from Ansari *et al.* (2016), Cozzolino and Rothaermel (2018) as well as Hora *et al.* (2018) and offer a holistic foundation for future research.

Undoubtedly, certain similarities exist between homogeneous and heterogeneous coopetition. While both types share characteristics in the areas of environmental influence, critical success factors, as well as sources for tensions, the fundamental inhomogeneity of start-ups and incumbents entail distinctive characteristics of the partnership, which demand special consideration. In particular, the dissimilar motivations lead to unique shifts in the coopetitive balance, tensions as well as success factors, and result in a specific innovation diffusion process. Only if research distinguishes these finer-grained categories of coopetitive partnerships, advancements can be accomplished.

The need for these more granular categories becomes particularly evident in the theoretical contribution of this study to the conjunction of the field disruptive innovation theory and coopetition. I observed that heterogeneous coopetition lead to a specific diffusion process of an innovation. To balance the interests of each partner, the start-ups

enter the coopetition with a sustaining innovation, which enhances the existing offering of the incumbents. The partnership allows coping with market entry barriers and accelerates the growth of the entrepreneurial firm at the beginning of the venture. Over time, the start-up advances its offering and eventually plans to establish the disruptive innovation in the market. As this partnership progresses, the start-up's dependency of the incumbent diminishes, so that the coopetition becomes increasingly competitive.

In contrast, homogenous coopetition is characterized by high similarities between the partners. These similarities surface, for instance, in the motivation factors, which are less divergent than in heterogeneous partnerships. This homogeneous motivation factors are again reflected in the process of coopetition, since the timing of the realization of benefits is less dissimilar. Consequently, this results in other balance shifts, other tensions and a different type of innovation diffusion. The identification of the distinctive innovation diffusion process as a result of heterogeneous coopetition follows the call for more research in the conjunction of disruptive innovation theory and coopetition by Bouncken *et al.* (2015) as well as Ritala *et al.* (2016) and adds to the previous findings in this field by Ansari *et al.* (2016).

5.3 Managerial Implications

Besides contributing to existing theory, this study defines several managerial implications for both leaders of start-ups and established firms, which I elucidate in the following. As a result of high resource and skill complementarity, previous research already indicates that collaboration among start-ups and incumbents is particularly beneficial for the involved parties (Freeman and Engel, 2007; Weiblen and Chesbrough, 2015). My study underscores these findings, while highlighting certain managerial implications

For leaders of entrepreneurial firms, this study suggests that partnerships with incumbent firms can be very valuable. Especially in industries and markets with significant market entry barriers, an incumbent partner which is already operating in this environment can help the start-up overcoming the initial obstacles. The Business Development Leader of Start-Up A illustrates that to "move the object, you need to overcome the static friction, and then the object is rolling and that requires much less force", referring to the challenges in the early stages of a start-up. This study suggests that start-ups should first collaboratively develop a sustaining innovation with the incumbent company, easing the initiation of the coopetitive partnership. During the collaboration, the start-ups can

expand their offering to transition to the disruptive innovation and eventually deploy that innovation within the initiated coopetitive partnership.

For leaders of incumbent companies, the coopetitive partnership can be equally beneficial because it has the potential to avoid a disruption of its business model in the long-term. Nonetheless, decision-makers at the established firm need to be aware of the coopetitive balance throughout the process to ensure a win-win-relationship. In particular, it is important to establish mutual trust and long-term commitment, so that not only the start-up gains an advantage through realizing the short-term benefits. If the partnership is construed only for a short period, the incumbent company risks boosting the growth of the disruptive start-up and eventually supports the disruption of the market it is operating in.

For both parties, I recommend keeping the defined critical success factors in mind throughout all stages of the partnership. At the initiation stage, the parties should ensure high complementarity of skills and resources, willingness and capabilities to innovate as well as the low distance of each party's corporate cultures. During the early stages of the coopetition, the partners should align visions and objectives and install clear communication structures and responsibilities. Throughout the process, I further recommend proactive management of coopetitive balance and tensions, to increase the probability of value creation on both joint- and firm-level.

5.4 Limitations and Suggestions for Future Research

This chapter presents the limitations and suggestions for future research, before it concludes the thesis. Limitations are crucial for explaining the generalizability of the research. Based on my methodological approach, I define several limitations.

First, the multiple case study is based on four cases within the energy industry. Since I indicate that the commercial environment has a significant impact on the strategies of the involved parties as well as on the coopetition itself, the findings are only generalizable on industries with certain characteristics. I determine that industries with high entry barriers due to regulatory or infrastructural requirements fulfil these characteristics. By no means, the findings are only applicable to the energy industry. In fact, I argue that the healthcare industry is only one exemplary environment for which these findings can be transferred.

Nevertheless, this assumption has yet to be affirmed and thus replicating this study in other industry environments represents a clear path for future research.

Second, as I follow the multiple case study approach as outlined by Eisenhardt (1989), it is necessary to establish comparative grounds among the cases. As I selected cases from a clearly defined population through theoretical sampling based on three specific requirements, I control extraneous variation. While Appendix 1 illustrates the results of the highly systematic selection process, certain dissimilarities among the cases persist. Similar to the study of Harris and Sutton (1986) and in alignment with the recommendations of Eisenhardt (1989), the procedure led to selecting cases from diverse geographies to develop new theory, which is generalizable across different geographical environments. Furthermore, by analysing the cases separately, it became evident that the start-ups are in slightly deviating stages of the commercialization process. I claim that this does not undermine the necessary comparative grounds because it supports the insight into different stages of the commercialization process. Moreover, I argue that the high concordance among the cases further signalize that appropriate comparability was established across the cases. However, certain limitations and suggestions for future research due to the case selection remain. On the one hand, the novel empirical findings are only substantiated by the four cases of my study. Undoubtedly, these findings have to be corroborated or repudiated by replication of the methodology on other cases. The cases of the defined population, which were not considered due to immaturity, would be interesting for replication once they reach the required stage of the commercialization process. On the other hand, a single case could be selected to gain even deeper insight into the underlying processes of heterogeneous coopetition. This is also in line with the described trade-off between richness and the number of cases by Piekkari *et al.* (2009). The single case study can focus on generating even richer insight and reaffirming the findings of my multiple case study, as explicated by Langley and Abdallah (2011).

Third, this study explicitly focuses on the perspective of the start-up. In the methodological approach, I decided to concentrate on collecting data on this perspective, while reaching the required saturation for data on the incumbent's perspective was solely achieved with primary data from the expert interview with Michael Barnard as well as comprehensive secondary data published by these companies. Even though the collected data ensures validity and reliability for the scope of this study, collecting further primary data from the incumbent's innovation departments on the collaborations would further

bolster the findings. Hence, I define the exploration of the incumbents perspective as another path for future research to elucidate emerging patterns on the other perspective.

Fourth, although I was able to choose four globally leading start-ups in the blockchain-based P2P energy trading space, all four enterprises are at a relatively early stage of their venture and thus the magnitude of the collected data represents ex-ante information. Even though this data is very suitable for the purpose of this study as it elucidates reasons for strategic choices, this data does not allow the retrospective evaluation of these decisions. Consequently, I cannot reliably analyse the effectivity of diverging actions of the start-ups. However, this limitation represents a promising research area for the future, once ex-post data is available to evaluate key decisions.

Fifth, as I frequently mentioned throughout this study, the research area of heterogeneous coopetition is still in its infancy. This exploratory study in combination with previous findings from other authors builds a fundament for future research. However, to bolster the current state of research on this topic, I recommend additional studies particularly on motivation factors, coopetitive balance and tensions, critical success factors as well as the impact on the innovation diffusion process. Undoubtedly, the defined term "heterogeneous coopetition" demands further substantiation, as it comprises not only partnerships among start-ups and incumbents, but also among other dissimilar types of companies such as small and medium-sized enterprises or multinationals.

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Appendices

Appendix 1: Overview of Potential Case Companies

Name	Country	Brief Description	Founded	Collaboration	POC/MPV
Start-Up G1	Germany	Start-Up G1 is a start-up founded by the Incumbent G's innovation hub, before it was spun out. It aims to build a blockchain-powered energy marketplace.	2017	✓	✓
Start-Up S	Singapore	Start-Up S develops a blockchain-based peer-to-peer energy trading platform.	2017	✓	✓
Start-Up UK	United Kingdom	Start-Up UK's mission is to develop the shared, digital infrastructure that underpins the energy transmission, and executed its first P2P energy trade in 2018.	2015	✓	✓
Start-Up C1	China	Start-Up C1 wants to decentralize the power infrastructure into millions of self-sufficient microgrids and thus enable blockchain-based energy trading.	2014	✗	✗
Start-Up C2	China	Start-Up C2 aims to enable energy transaction and settlements on microgrids, so that intermediaries are eliminated.	2016	✗	✓
Start-Up I	Israel	Start-Up I is not only focussing on developing a P2P energy trading platform, but also on other decentralized solutions for future energy network.	2016	✗	✓
Start-Up G2	Germany	Start-Up G2 co-founded the EWF and boasts both utility companies and start-ups to develop innovative solutions.	2016	✓	✗
Start-Up US1	United States	Start-Up US was incubated by ConsenSys, and will operate as a commercial electricity retailer in deregulated markets.	2017	✗	✓
Start-Up U	United States	Start-Up U was the first start-up, which executed a blockchain-based p2p energy transaction on its Brooklyn Microgrid.	2012	✓	✓
Start-Up G3	Germany	Start-Up G3 developed the EnerChain and consults incumbents in the energy industry to introduce this p2p energy trading system.	2001	✓	✓
Start-Up A	Australia	Start-Up A is developing different blockchain-based systems for the energy industry. Among those the p2p energy trading marketplace for residents.	2016	✓	✓
Start-Up US2	United States	Start-Up US2 developed an adaptive solar microgrid system with includes a blockchain-based p2p energy trading application.	2018	✗	✗
Start-Up E	Estonia	Start-Up E builds a platform which brings together producers and consumers, as well as allows the p2p trading of PPAs, primarily for commercial customers.	2017	✓	✓

chosen
not chosen due to lack of access
not chosen due to lack of POC/MVP/collaboration
not chosen, because not an (independent) start-up

Appendix 2: Interview Guide for Start-Ups

Part 1: Questions related to Start-Up itself

1. Could you please briefly explain how your company got started and evolved (idea, vision, growth intentions, financing, internationalization strategies)?
2. What are the biggest challenges your start-up is facing (in general & especially regarding innovations)?
3. What are your target customers at the moment and how do you plan to approach them?
4. How do you collaborate with TSOs/DSOs to attain access to the required physical infrastructure?

Part 2: Questions related to Start-Ups Strategy

5. What are the most challenging standards and regulations you are facing and how does your strategy take them into account?
6. How does blockchain-technology affect your strategy/business-model?
7. What are your competitors and in what ways do you compete with those?
8. What do you think is your competitive advantage?

Part 3: Questions related to the Coopetitive Partnership

9. With which companies are you currently collaborating?
10. How would you classify these companies?
    a. Competitor
    b. Complementor
    c. Supplier
    d. Customer
11. What are the main motivations behind the collaboration (for each side)?
12. What are the common objectives of the collaboration?
13. Which factors are critical for the success of the collaboration?
14. Which resources/skills/knowledge does your start-up bring into the cooperation?
15. Which resources/skills/knowledge does the partner company bring into the cooperation?
16. In what way is knowledge shared/protected between the partners of the cooperation?
17. What is the legal and organizational structure for the collaboration?
18. Who is involved in the collaboration (employees/departments)?
19. How important is the collaboration for the success of your start-up?
20. How much influence does the partner company have on changes on the service/platform?

Part 4: Questions related to the Diffusion of Disruptive Innovation through Coopetition

21. What have the outcomes of the collaboration been so far?
22. How has the collaboration benefitted the diffusion of your innovative solution so far?
23. How satisfied are you with the collaboration and where do you see room for improvement?

Appendix 3: Interview Guide for Industry Expert

Part 1: Introductory Questions

1. Where do you see the biggest disruptive potential of blockchain-technology in the energy industry?
2. Which role does regulation play in the diffusion of blockchain-technology in the energy industry?
3. To which extent can blockchain-based P2P energy trading platforms disintermediate the market?

Part 2: Questions related to the Start-Ups

4. What are the key challenges the start-ups are facing?
5. Who are they key players in the blockchain-based P2P energy trading space?
6. What are the go-to-market strategies of these start-ups to disrupt the energy industry?
7. How does blockchain influence the business model/strategy of these start-ups?

Part 3: Questions related to the Incumbent Companies

8. For which players in the market will blockchain technology be the biggest threat?
9. How do incumbent companies react to this disruption?
10. Do you think that energy retailers or utility companies become unnecessary at some point?

Part 4: Questions related to the Coopetitive Partnership

11. Which partnerships between these start-ups and incumbents are you aware of?
12. What are the motivations for the parties to engage in these partnerships?
13. Which resources/skills/knowledge do the parties bring into the collaboration?
14. How important are the partnerships for the success of the start-ups?
15. How does the partnership promote the innovation diffusion process?

Appendix 4: Coding Scheme (Theme 1 & 2)

Theme 1: Commercial Environment

Commercial Environment	Exclusivity of infrastructure Reg - Coping with regulation through collaboration Reg - Deregulation supports competition & innovation diffusion Reg - Impact start-up's BM, OM & Product Reg - Liability of newness explains complex regulatory situation Reg - Protection of incumbents from disruption Reg - Regulatory changes are dificult/slow Reg - Regulatory complexity lead to high regionality Shifting Consumer Needs

Theme 2: Motivations

Motivations of Start-Up	Acceleration and scale-up Access to infrastructure Avoid battle with giants Customer base of In Demonstration of tech Funding Increase focus on core competencies Learning through collab Market knowledge Market power Publicity and credibility Regulatory compliance Tech outpaces Policy
Motivations of Incumbent	Access to technological know-how Build innovation capability Define of new business model Differentiation from competition Exploration of new technology Increase operational efficiency

Appendix 5: Coding Scheme (Theme 3 & 4)

Theme 3: Coopetition

Coopetition - Critical Success Factors	Aligned Vision Capability and capacity of partners Clear communication & responsibilities Complementarity of skills & resources Long-term dedication Open knowledge sharing Willigness to innovate
Coopetition - Frictions	Conflicting interests Risk-taking mentalities Short-term pain, long-term gain
Coopetition - Knowledge	KH Prot - Code IP KH prot - Less important, execution matters KH Shared - Blockchain Understanding KH Shared - End Product Works KH Shared - Market Knowledge KH Sharing - Guidelines not important KH Sharing - Important to improve tech
Coopetition - Organisation	Communication Include regulatory stakeholder Initiation of coop People involved in collaboration Structure
Organisation - Resources	Res In - Data Access Res In - Licenses Res In - Market Insights Res In - Willigness to Innovate Res S - Flexibile Start-Up Mentality Res S - Innovative Tech Res S - Innovativeness Res S - Unique Knowledge
Organisation - Scope	Changes over time Deployment Trial

Theme 4: Innovation Diffusion

Innovation Diffusion	Acceleration through Deregulation Bottom-Up approach to disruption Disruption wo destroying In Partnership is crucial Path to Mainstream Single partner less important

Appendix 6: Coding Scheme (Other Themes)

Other Themes

Strategies of Start-Ups	ComEn leads to a 2-fold Strategy Disruption with partner is better option Disruption with partner is only option Disruption without partner
Blockchain	Adoption Especially useful in regulated industries ICO - Pubclicity and Credibility ICO - Early Adoption ICO - Impact on Funding ICO - Impact on Leadership ICO - Issue w regulation
Energy Industry	Disruption through new value proposition Future History Today

Appendix 7: Cooperative and Competitive Forces impacting Coopetitive Balance

		Start-Up A	Start-Up E	Start-Up S	Start-Up U
Pre-commercialization Phase	Cooperative	• **Small-scale pilot**: start-up and incumbent collaborate to test the functionality of the P2P energy trading platforms either at the main electricity grid or through simulations using historical data. Pooling of resources and skills to overcome technological barriers • **Large-scale trial**: both parties work together on the main electricity grid to test the previously proven technology on a larger scale, leveraging the existing customer base of incumbents as well as the technical know-how of the start-up			
	Competitive	• **Disruptive nature**: only the inherently disruptive nature of P2P energy trading platforms on the incumbents can be defined as competitive force, although this force is largely negligible in this step			
Commercialization Phase	Cooperative	• **Customer-Supplier-Model**: Start-Ups become a software-supplier, technology-provider or consulting firm for the incumbent companies, meaning that the relationships develop towards the customer-supplier model. • **Cooperation**: However, due to the novelty of the technology, both parties need to cooperate as the P2P energy trading platforms are still in an emerging phase with new insights evolving continuously.			
	Competitive	• **Non-exclusivity**: although the cooperation between the start-up and incumbent continues, the start-up can gradually offer the technology to competitors of the incumbent, since the maturity of the platforms increases • **Ownership**: while the platforms are provided by the incumbent, the start-up keeps being the owner of the back-end and hence control over the underlying technology, so that it can enter relationships with other incumbents			
Expansion Phase	Cooperative	• Continuous collaborative development of technology • Energy retailer deploys the software and remains central player in the framework			• Continuous collaborative development of technology • "Utility-as-a-Platform", where incumbent still possess a central role.
	Competitive	• Marketing & sales of its technology to other incumbent companies • Cannibalization of existing business of incumbent	• Deployment of platforms • Marketing & sales of technology to customer base of incumbent company	• Deployment of platforms • Marketing & sales of technology to customer base of incumbent company	• Marketing & sales of its technology to other incumbent companies • Cannibalization of existing business of incumbent